

HITCHCOCK'S *Machine Tool* BLUE BOOK

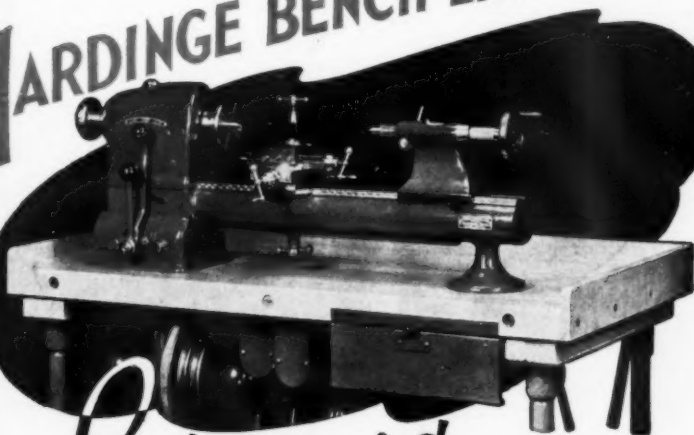
FOUNDED

NOVEMBER 1938

1905

MANUFACTURING ORGANIZATIONS
ARE INSTALLING

HARDINGE BENCH LATHES



Because —

The preloaded ball bearing spindle construction gives carefree high spindle speeds and extreme accuracy.

This feature insures greater production and lower cost.

Entire batteries of sleeve bearing machines are being replaced by these preloaded ball bearing bench lathes which have proved their efficiency over a long period of service.

Five sizes, $\frac{1}{2}$ " to 1" collet capacity, 7" and 9" swing.

Spindle speeds up to 3900 r. p. m.

Send Quickmail Coupon No. 1 for full details.

Catacract

PRECISION
BENCH MACHINE TOOLS

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

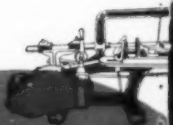
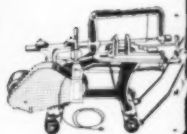
CHICAGO • NEW YORK • PHILADELPHIA • DETROIT • HARTFORD

PUBLISHED AT 508 SO. DEARBORN ST., CHICAGO

MARVEL SAWS

**CUT FAST, SAW STRAIGHT,
SAVE BLADES**

Among low priced dry cutting, general purpose hack saws, none compare with the MARVEL No. 1 and No. 2 for utmost dependability and all around utility. That is why 80% of the small dry cutting saws in use are MARVELS.



CHECK OVER THESE FEATURES

Heavier, sturdier construction with (1) Heavy Rigid Frame, (2) V-Bearing with Screw Take-up, (3) Adjustable Blade Tension, (4) Swivel Vise, (5) Automatic Stop, (6) Feed Pressure Adjustment, (7) All-Front Control, (8) Adjustable Stroke, (9) Stationary or Portable, Belt or Motor Driven Models, (10) Low Price.

Belt Driven:

No. 1 Capacity 4"x4" 846.00

No. 2 Capacity 8"x8" 79.00

also available in Motor Driven Types and Portable Models. *Send Quickmail Coupon No. 5 for catalog.*



MARVEL No. 1
(capacity 4"x4")

ARMSTRONG-BLUM MFG. CO. "The Hack Saw People" CHICAGO

1144 BLOOMINGDALE AVENUE

STRAIGHT ROUND SMOOTH

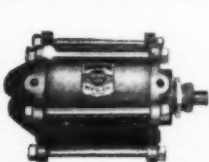
Hannifin Air Cylinder bores are ground and honed on special long-stroke honing machinery developed by Hannifin engineers. The cylinder bores thus produced are straight, round, and smooth, and with the easily adjusted piston packing, provide for a perfect piston seal that can be consistently maintained.

Hannifin "Leak-proof" construction allows simple outside adjustment of the soft, graphite treated piston packing—without disturbing any other parts. The original high-efficiency piston seal is easily maintained throughout the entire life of the packing. Maximum utilization of air power is assured, with minimum friction loss.

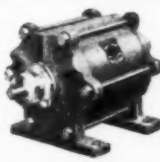
Hannifin "Leak-proof" Air Cylinders are built in a complete range of standard types and mountings, sizes $1\frac{1}{2}$ to 16 in. diameter, for any length stroke. Larger sizes built to order. Single acting or double acting types, with air cushion at either or both ends if required.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue, Chicago, Illinois

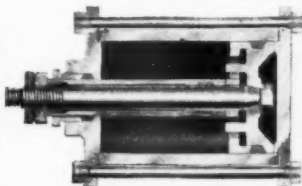
HANNIFIN IMPROVED AIR CYLINDERS



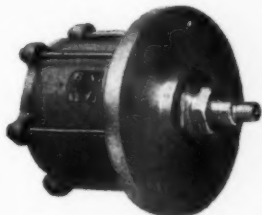
Model BR—double acting air cylinder



Model CR—double acting air cylinder



Sectional view



Model JR—double acting air cylinder

Hannifin "Pack-less" Air Control Valves available in all types for positive control of air operated equipment





T O GIVE PRECISION

Timken zero precision mirror finish roller bearings
—dynamic balance of every rotating part—
accurate gauging and inspection

T O KEEP PRECISION

Maximum slide areas—sturdy construction—
three point bed mounting—perfection in ma-
terial and workmanship

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PIONEERS IN BENCH LATHE DEVELOPMENT

For information use Quickmail Coupon No. 21

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Steel Hand and Power Brakes—Most Modern for Today's Production Needs

36 Years' Experience..



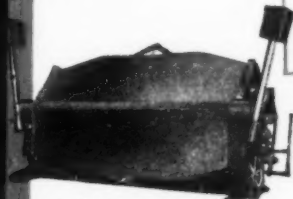
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BRAKE—**

Forms boxes or pans from one piece of metal. A straight brake as well as a box brake. Ideal for experimental shops.



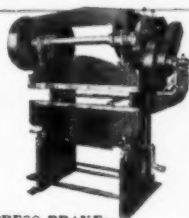
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Improved to meet modern needs. Efficient and dependable — sturdy and durable.



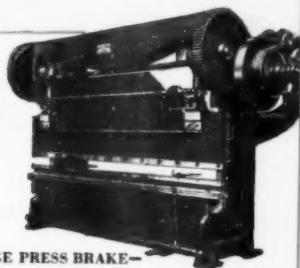
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Indispensable wherever a volume of heavy plate work is done—forms a great variety of bends and shapes without dies.



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Compact, powerful money-saving production unit. Replaces cumbersome costly machines that are expensive to operate. Uses same dies as larger machines.



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The only press brake which turns out perfect work without shims and crowned dies. Patented non-deflecting bed equalizes pressure over the full bending length and overcomes major fault in solid bed press brakes.



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We manufacture any type of die required for forming brass. Our die department will quote on any type to meet your needs. Submit blue print or sample of work.

We Are The World's Largest Manufacturers Of Hand Bending, Power Bending And Power Press Brakes.

Aside from the CHICAGO line, we have built many special machines for intricate bending operations. Take advantage of our many years' experience by sending us any difficult bending problem you have.

DREIS & KRUMP MFG. CO.

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CHICAGO, ILL.

OVER 40,000

"CHICAGO" BRAKES in use by leading concerns—the world over

MORRISON

MASTER FEEDING FINGERS



MORRISON
MASTER FEEDING FINGERS
WITH *Replaceable* PADS
WILL SAVE 30% to 80% OF
FEEDING FINGER REPLACEMENT
COST—

REPLACEABLE PADS IN
HARDENED STEEL, NICKEL
CAST IRON AND BRONZE

REAL ECONOMY

for

Brown & Sharpe, Cleveland, Cone, Davenport
Gridley, National Acme, New Britain and all other
makes of automatic screw machines.

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COLLETS · FEED FINGERS · PADS · FORM TOOLS

FOR

ALL MAKES OF AUTOMATIC AND HAND SCREW MACHINES

COLLETS

—IMMEDIATE SHIPMENT FROM STOCK—

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ALL SIZES




HARDINGE

COLLETS SINCE 1880

DRAW-IN COLLETS

FOR ALL
LATHES AND MILLERS



PROPT
DELIVERY
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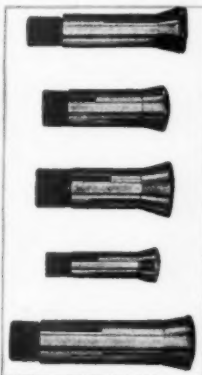
FOR
— ACCURACY—
— DURABILITY—
— ATTRACTIVE PRICES—
"SPECIFY HARDINGE COLLETS"

Refer To Inside Pages For Your Requirements
Purchasing and Engineering Departments. Keep This List for Reference Purposes

Hardinge Collets are in stock for immediate delivery. Hardinge Collets embody
these elements of precision which have characterized our products since 1880.

HARDINGE BROTHERS, INC., ELMIRA, NEW YORK

ALL TYPES



**THE ABOVE COLLET DATA BULLETIN IS AVAILABLE FOR
PRODUCTION, PURCHASING, STOCKROOM AND ENGINEERING
DEPARTMENTS**

Reasons Why Each Department Should Have a Copy:

1. Clearly shows the styles of collets adapted in your lathes and millers.
2. Lists the standard collets with general dimensions for identification.
3. Gives normal round, hexagon and square capacity of standard collets.
4. Shows how all of your lathes and millers may be adapted for collets.
5. Collet stocks in Elmira, Chicago, Detroit, Cleveland, New York, Hartford and Los Angeles.
6. Attractive prices are listed for round, hexagon and square hole sizes.

HARDINGE BROTHERS, Inc., Elmira, N. Y.

SPECIFY HARDINGE COLLETS

Which Advantage OF USING EX-CELL-O CARBOLOY TOOLS Do You Want

FASTER CUTTING

Speed

?

LONGER TOOL

Life

*On more than 100 typical jobs, Carboly tipped tools increased speeds over previous tools by the average percentages given below:

153% on Cast Iron
238% on Aluminum Alloys
297% on Brass, Bronze, Copper
175% on Non-Metallic Materials

*On 100 typical jobs, Carboly tipped tools increased pieces per grind over previous tools by the average ratios given below:

29 times on Cast Iron
32 times on Aluminum Alloys
36 times on Brass, Bronze, Copper
30 times on Non-Metallic Materials

*These applications were selected at random, and are a representative cross-section of operations, materials and parts.

You want to meet rising labor, material and tax costs by making new production savings. Perhaps, with our experience as both machine tool builders and cutting tool manufacturers, we can offer you some helpful suggestions. We may be able to show you how **your** parts can be more **profitably** machined. Begin to check up now. Send for literature on Ex-Cell-O Carboly Tipped Tools . . . then if you feel we can help you, ask to have one of our Sales Engineers call next time he is in your city.

EX-CELL-O CORPORATION, 1188 Oakman Blvd., Detroit, Mich.

EX-CELL-O

DRILL JIG BUSHINGS, GRINDING SPINDLES, HYDRAULIC POWER UNITS, PRECISION BORING, TURNING AND FACING MACHINES, PRECISION THREAD GRINDERS, COUNTERBORES, BROACHES, CARBIDE TOOL GRINDERS, CARBOLY TIPPED TOOLS, SPECIAL HIGH PRODUCTION MACHINES, GROUND FORM TOOLS, PRECISION PARTS, MILLING CUTTERS

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**TOUGHEST
GRINDING JOBS
are EASY for
SKILSAW
DISC SANDER**
... it's faster and
more powerful!

• Here SKILSAW DISC SANDER with cup grinding wheel cuts through the surface crust of a heavy boring-mill bar prior to testing the metal after heat-treating.

• Grind down costs and do a better job with Disc Sanders . . . they tackle the toughest weld- and cleaning work and do it faster and easier! Use SKILSAW Disc Sander with cup grinding wheels (up to 6 in. diam.) and watch the raised welds just melt away, leaving the surface as smooth and clean as you want it. Made in 3 models, for use with grinding wheels, wire brushes, polishing pads, etc., on flat, concave and convex surfaces of metal, wood, stone, marble, tile and composition. Send Quickmail Coupon No. 27 for New Complete Catalog.

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Sold by leading distributors of mine, mill, hardware and contractors' supplies

3 MODELS
... a size to fit every job!

SKILSAW

PORTABLE ELECTRIC TOOLS

SAVE MONEY IN EVERY INDUSTRY!

• SAWS • DRILLS • BELT SANDERS • DISC SANDERS • GRINDERS • BLOWERS •

KELLERFLEX



DL-3

A single speed, heavy duty machine with a $\frac{1}{2}$ H. P. motor, mounted on a low roller floor stand.



DS-5

A suspended type, direct driven, single speed machine with a 1 H. P. motor.



JF-3

A multiple speed machine with a $\frac{1}{2}$ H. P. motor. It is mounted on a roller floor stand which is adjustable in height to suit the job.

FLEXIBLE SHAFT MACHINES

Kellerflex machines are correctly designed and precision built. They contain the finest materials and will give many years of good service. Kellerflex machines all have ball bearing motors, and ball bearing hand pieces that will not heat up in use. On multiple speed machines the jack shafts are ball bearing mounted, and are easily adjustable for proper belt tension. Cables and casings are matched, insuring correct fits and smooth performance, with consequent long shaft life.

Kellerflex machines can be furnished "tailored" for a

particular job. This means that the speed ranges can be adjusted to suit individual conditions, and assure efficient operation. This is a valuable feature if your flexible shaft machines are to operate properly.

A wide range of equipment is available for Kellerflex machines, which adapts them to almost any kind of work. It will pay you to know about these cost cutting machines and the work they do. When you think of flexible shaft equipment, think of Kellerflex, made by Pratt & Whitney. Write for free literature.

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND CO.

HARTFORD, CONN.

Kellerflex Sales Department

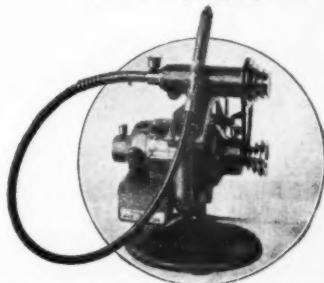
JB-1

A multiple speed bench type machine with a 1/4 H. P. motor.



JB-0

A small multiple speed bench machine with a 1/8 H. P. motor. It is capable of using small tools at very high speeds.



Send Quickmail Coupon No. 6.

DRILL 75% FASTER

*Drills Stay Sharp
Longer!*

A New Patented Carbide Tipped Drill

specially designed for drilling holes in non-metallic materials, such as concrete, tile, brick, slate, plaster, limestone, marble, asbestos, wallboard, asphalt, glass, carbon, etc. It can be operated in a drill press, electric drill or hand brace at any number of revolutions per minute. No coolant is necessary.

The tip of the drill approaches the hardness of diamonds, yet it can be sharpened on any type and make of grinding machine and grinding wheel. Maintenance engineers find this drill useful for installing machines, as well as for many other applications.

in concrete, tile,
brick, slate, plaster,
limestone, marble,
glass, carbon,
asbestos,
etc.

(Patented)



New!

Write for
particulars.

TUNGSTEN CARBIDE DIES BY WILLEY'S



We have developed a special grade of Tungsten Carbide, covered by U. S. Patents, with the requisite characteristics for dies. It is free from porosity, offers great resistance to abrasion and takes a polish equal to diamonds. These and other important characteristics make our metal ideal for sizing, extrusion and wire drawing dies.

Our modern equipped plant and laboratory assure you uniformity in material and super workmanship on standard or special shape dies to conform with your requirements.

Use Quickmail Coupon No. 66, stating on which tool you desire information.

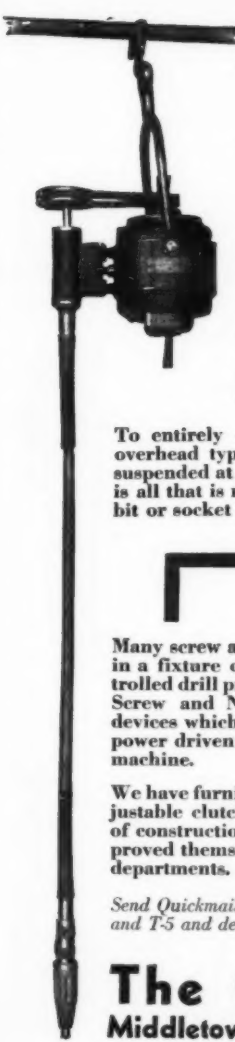
WILLEY'S CARBIDE TOOL CO.

1344 W. Vernor Highway,

Detroit, Michigan


SCREWS

.. SHOULD BE DRIVEN MECHANICALLY



In driving screws or nuts at a uniform tension, independent of the operator's skill, Jarvis Screw Driving Equipment with the tension adjustable clutch has no equal.

To entirely eliminate fatigue of operator the overhead type units are carefully balanced. If suspended at the proper height a slight pressure is all that is required to engage the screw driver bit or socket wrench.



Many screw and nut driving jobs can be handled in a fixture on a hand, or better yet, foot controlled drill press. The Jarvis Tension Adjustable Screw and Nut Drivers are inexpensive clutch devices which will convert a drill press or similar power driven unit into a screw and nut setting machine.

We have furnished thousands of these tension adjustable clutches, which due to their simplicity of construction and unfailing performance have proved themselves a standard device in assembly departments.

Send Quickmail Coupon No. 22 for new catalog MS1 and T-5 and describe to us your screw driving problem.



The Chas. L. Jarvis Co.
Middletown Connecticut

1500 to 3200 STRONGER JOINTS AN HOUR

**SOLID RIVETS FED
AND SET... AUTO-
MATICALLY.**

AN ENTIRELY FILLED
HOLE... INSURING
← RIGIDITY.

NO FLASHING..PARTS
ARE HELD TIGHTLY
TOGETHER WHILE
← THEY ARE BEING RI-
VETED.

"R" Machine sets up to $\frac{1}{4}$ " dia.
 $\frac{3}{8}$ " long solid rivets at rates up
to 1500 an hour.

"BR" Machine sets up to $\frac{1}{8}$ "
dia. x $\frac{1}{4}$ " long solid rivets at rates
up to 3200 an hour. Write for
Bulletin Numbers R-3 and BR-1,
using Quickmail Coupon No. 90.

**TOMKINS
JOHNSON**
605 N. Mechanic, Jackson, Mich.

RIVITOR

You'll Do **BETTER, MORE ACCURATE**
work with the **NEW**

"Buffalo" **No. 18**

**PRODUCTION
DRILLS**

Here's why

- Drill may be operated by either hand or foot feed.
- Columns are large and heavy.
- Drill especially designed for rapid handling of jigs and fixtures.
- Tables and bases have large working surfaces.
- Capacity up to 1" holes in cast iron.
- 19 models to meet all production drilling requirements—bench and floor type, single or multiple spindle.

Why not replace your wobbly, worn-out drills now with these high grade medium priced Buffalo 18 drills.

Write for Bulletin No. 3123—Using
Quickmail Coupon No. 9.

BUFFALO FORGE CO.

161 Mortimer St., Buffalo, N. Y.

Branch Engineering Offices in Principal Cities

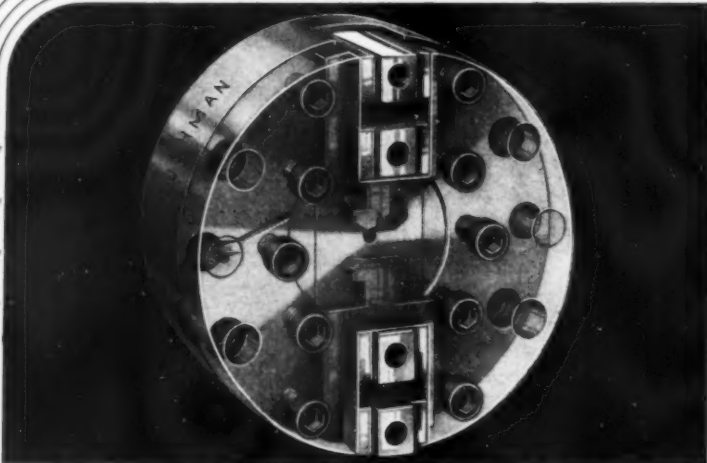
In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



new CUSHMAN

POWER CHUCKS

6"
8"
10"
12"



With **HARDENED STEEL BODIES . . .**

2 JAW - 3 JAW

•
a new conception
of accuracy and
quality in small
size power chucks
•

An extremely simple and efficient design, the entire body and all operating parts are of hardened alloy steel. All bearing surfaces are ground to precision gauges. The new wedge actuated jaw movement is at once compact, smooth in operation and extremely powerful. As will be seen from the above phantom view, bearing surfaces of both operating wedges and jaws are so large in area and so perfectly supported at all times that bell-mouthing cannot occur and wear is reduced to an absolute minimum. With top jaws in place the body is completely sealed . . . chip proof. Pressure lubrication, with fittings for standard grease gun. American Standard jaw design; all parts interchangeable.

Write us at once for descriptive Bulletin. The Cushman Chuck Company, Chucking Engineers since 1862, Hartford, Connecticut.

Use Quickmail Coupon No. 68.

A world Standard for **PRECISION**

1905 *Strand* 1938

FLEXIBLE SHAFTS AND MACHINES

VERTICAL AND HORIZONTAL TYPES $\frac{1}{8}$ —TO 3 H. P. CAPACITIES

IT PAYS TO BUY HIGH QUALITY EQUIPMENT

HOW DOES THIS LOOK
TO YOU FOR CLEAN
SMOOTH WELD GRINDING?



ROTARY FILES I
HIGH SPEED STEEL
HAND CUT

OUR LATEST CATALOG IS
NOW READY FOR
DISTRIBUTION

NOTE

YOU ARE NOT HANDICAPPED
WITH A CLUMSY HEAVY GRIND-
ER. CLEAR VISION OF THE WORK
—LIGHT WEIGHT GRINDING
SPINDLE—CONSTANT SPEED
—AND POWER—CHANGE SPEEDS
WHEN REQUIRED—SMOOTH
RUNNING, LONG LIFE MACHINES.
THESE ARE SOME OF THE IMPOR-
TANT REASONS WHY SO MANY
LARGE AND PROSPEROUS CON-
CERNS USE

STRAND
QUALITY EQUIPMENT

CHEAP MACHINES
ARE COSTLY AT ANY PRICE.

WRITE US OR USE
QUICKMAIL COUPON NO. 26.

N. A. STRAND AND COMPANY

EXCLUSIVE MANUFACTURERS

FLEXIBLE SHAFTS - MACHINES AND ATTACHMENTS

5001-5009 N. WOLCOTT AVE.

CHICAGO

WHY

⇒ HASKINS DELIVERS TOP TAPPING PRODUCTION
 ⇒ CONSTANT PRECISION LIMITS ARE OBTAINED
 ⇒ IT PAYS TO HAVE HASKINS FROM THE START



REASON ONE—The precision tools, equipment and workmanship used to build speed and endurance into the Haskins Tapper. The constant modernization of Haskins' own plant (in which 95% of all Tapper parts are made) with the newest in efficiency methods and precision equipment. Only precision maintained shop equipment can produce **PRECISION** tapping machines.

REASON TWO—The exclusive features of design, engineering and construction which distinguish the finished Haskins Tapper. Haskins pioneered such features as foot pedal control, rigid no-float spindle, instantaneous reversal of tap spindle. These mean quicker handling of parts, reduced operator fatigue, closer tolerance.



REASON THREE—Haskins Engineering Service—a vital part of the exclusive Haskins Method. Haskins Engineers regularly work out new fixture designs that simplify and speed up troublesome jobs.



REASON FOUR—Each Haskins field representative is a tapping authority. A trained tapping specialist able and willing to solve difficult problems. Haskins Service **BEGINS** where most service **ENDS**—with the sale!

Given here are some of the reasons why The Haskins Method is more than a machine—is, in fact, a new, more effective and more economical approach to the tapping problem. A free booklet—"Precision Tapping at High Speed"—completely describes this improved method and illustrates it in action. Write for your copy, using Quickmail Coupon No. 33. R. G. Haskins Co., 623 So. California Ave., Chicago.



REASON FIVE—The actual performance records chalked up by Haskins Tappers on every type of tapping job. The one illustrated—tapping two blind holes in a die casting—has been greatly simplified by the use of a Haskins designed swing fixture that minimizes handling operations and eliminates the need for clamps.

HASKINS

PRECISION
Tapping
Equipment

WHITNEY TOOLS

**MADE BY SPECIALISTS TO MEET EVERY
NEED OF PRACTICAL SHEET METAL MEN**



No. 10 Ball Bearing Punch

Capacity $\frac{3}{8}$ inch through $\frac{1}{4}$ inch iron. Depth of throat $1\frac{1}{4}$ inch. Height of throat $\frac{3}{8}$ inch. Furnished with one punch in any size from $\frac{3}{8}$ to $\frac{1}{2}$ by $\frac{1}{2}$.



No. 4 Angle Iron Shear

Capacity 2"x2"x $\frac{1}{4}$ " angle iron or smaller.



Angle Mitre Notcher and Angle Iron Bender

Capacity 2"x2"x $\frac{1}{4}$ " angle iron or smaller. A pair of tools that every shop ought to have. They are Nos. 50 and 51 in our catalog.

Whitney manufactures more than 80 types of Shears, Punches and other tool equipment for metal working — dependable items perfected through long experience and close contact with the trade — tools that have "always made good."

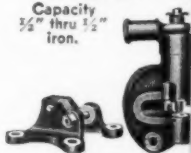


Imperial Roller Bearing Punches

— offered in 3 sizes — will work inside 90 degrees. Quick changing for punches and dies — no cams to wear — stripping action is positive.

No. 20 Ball Bearing Punch

Capacity $\frac{3}{4}$ " thru $\frac{1}{2}$ " iron.



Aircraft Rivet Squeezer

Capacity $\frac{3}{4}$ inch aluminum rivet. Spindle travel $1\frac{1}{2}$ inch. Made in 5 sizes, with throat depths from $1\frac{1}{4}$ to 6 inches.

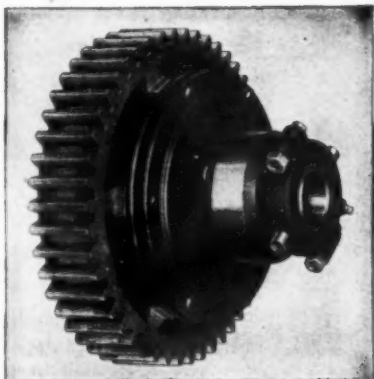
Quickmail Coupon No. 42 will bring you the complete Whitney catalog.

WHITNEY METAL TOOL CO.
ROCKFORD, ILLINOIS

Conway

Means--

EASY
ENGAGEMENT
INSTANT RELEASE
DRAGFREE IDLING
ABUNDANCE
OF POWER



More than that, CONWAY stands for simplified construction with fewer parts (all enclosed); perfect balance; centripetal action; dependable performance over long periods of service.

There are no if's, ands and buts when you install CONWAY Clutches. They're engineered for the job by Clutch specialists—there's a type and size for your specific requirements—and when you install CONWAY you can be certain of highly satisfactory Clutch performance.

Send for details on your Clutch needs—let CONWAY Engineers submit recommendations for the Clutch equipment you need. No obligation on your part.

Send Quickmail Coupon No. 23 for Catalog P-24 and Bulletin L-28 covering the type illustrated above.

Patented in U. S. A. and Canada.

THE CONWAY CLUTCH CO.
1541 QUEEN CITY AVE., CINCINNATI, OHIO

ARE YOU BREAKING TAPS?

THEN TRY A PROCUNIER TAPPER ON THE JOB

There is just no sense in breaking so many taps when PROCUNIER offers you double insurance against that pesty expense.

In most cases PROCUNIER high speed precision tappers will save enough in tap breakage to pay for themselves in three months. At the same time they will give you finer results and increased production.

Let PROCUNIER show you some real tapping.



Use Quickmail Coupon No. 11.
Send for this folder and try a
PROCUNIER high speed tapping
head with the new TRU-GRIP
Tap Holder.



PROCUNIER SAFETY CHUCK CO.
14 S. CLINTON ST., CHICAGO, ILL.

SAVE POWER COSTS

With the **TURNER**

UNI-DRIVE

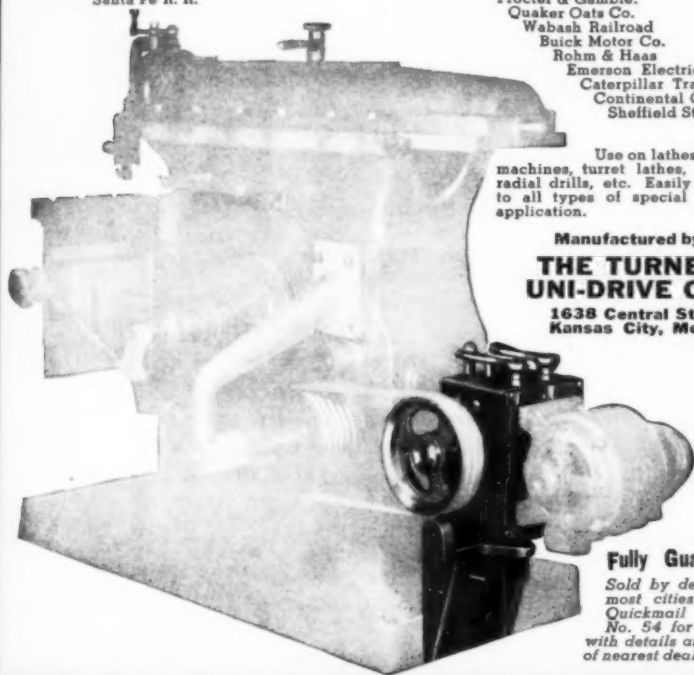
**THE MOTORIZING UNIT WITH FOUR-SPEED
SELECTIVE SLIDING GEAR TRANSMISSION**

Built in 4 Sizes From ½ H. P. to 10 H. P.

THE FOLLOWING CONCERNS ARE SAVING MONEY WITH TURNER UNI-DRIVE:

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Ohio Pattern & Foundry Co.
Missouri Pacific Railroad.
Kansas City Power & Light Co.
City of St. Louis, Mo.
Santa Fe R. R.

Locomotive Finished Material Co.
Standard Sanitary Mfg. Co.
Tennessee Copper Co.
Union Wire Rope Co.
Cushman Chuck Co.
Procter & Gamble.
Quaker Oats Co.
Wabash Railroad
Buick Motor Co.
Rohm & Haas
Emerson Electric Co.
Caterpillar Tractor Co.
Continental Can Co.
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Use on lathes, milling machines, turret lathes, shapers, radial drills, etc. Easily adapted to all types of special machine application.

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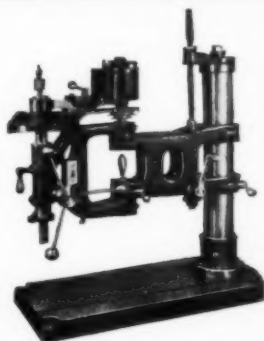
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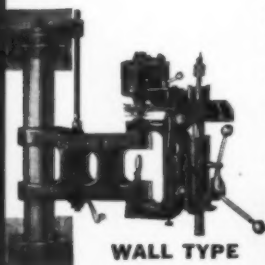
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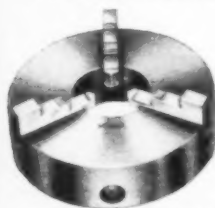


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With Solid Reversible Jaws

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Geared Scroll Combination Chucks

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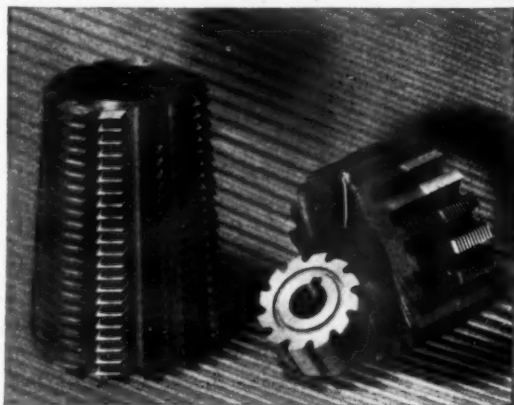
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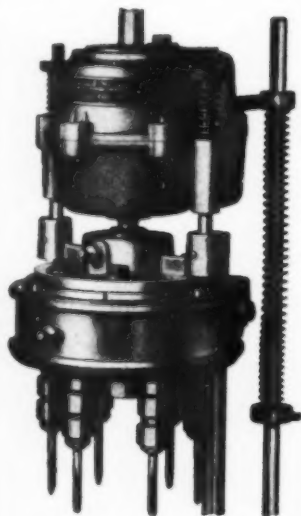
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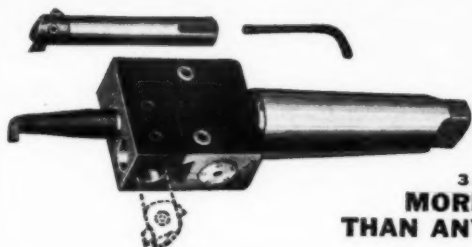
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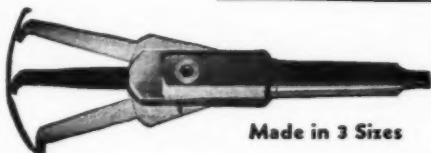
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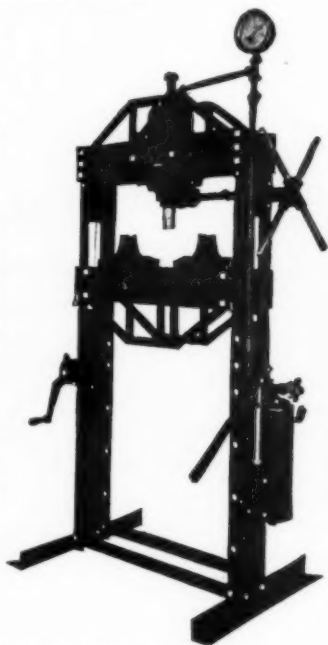
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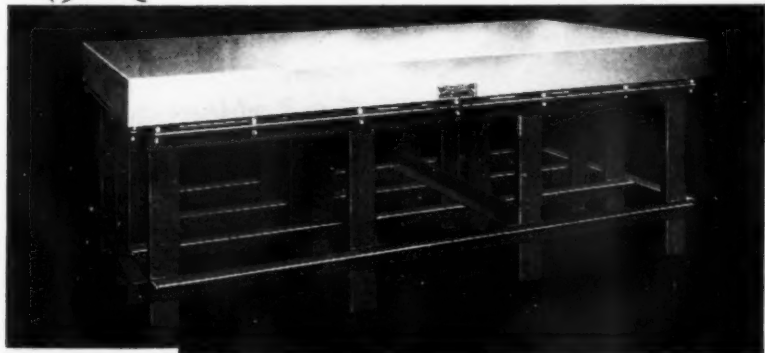
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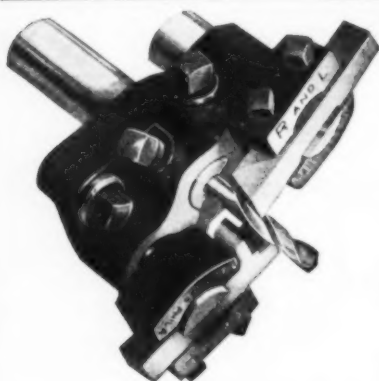
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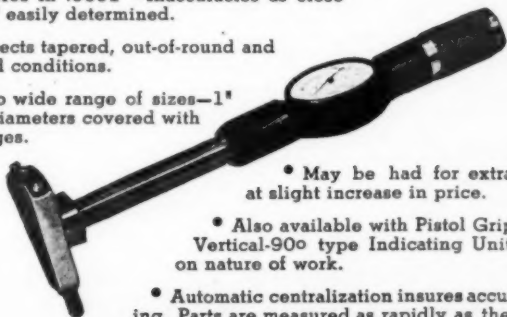
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 Job No.: ST 7015
 Total Quantity: 100 Rejection: 100
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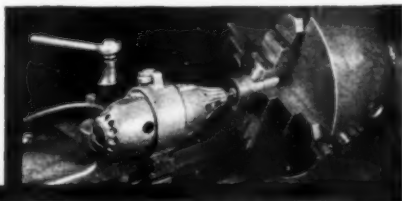
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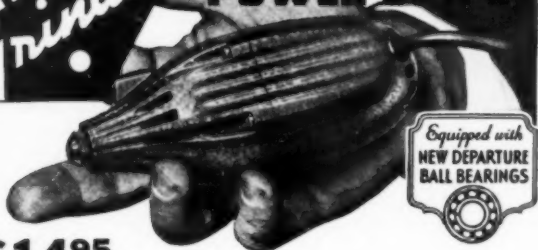
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**24000 R.P.M.
OVER 40 WATT
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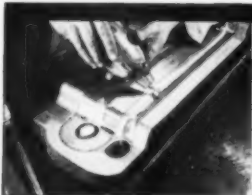


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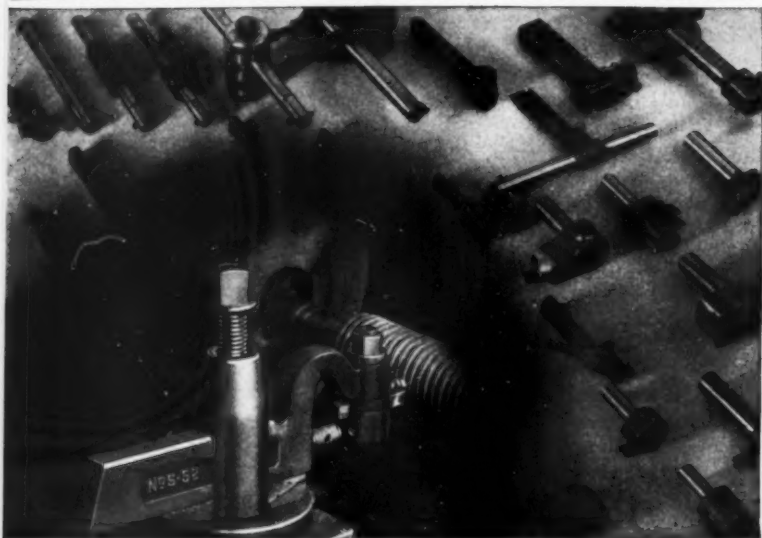


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CONTENTS

The Tool Room is the Bottle Neck by George Gorton, Jr.	39
Comments from the Editor	50
New Equipment	53
Quickmail Coupons	88-93
Buyers' Directory	138
Index of Advertisers	177. 178

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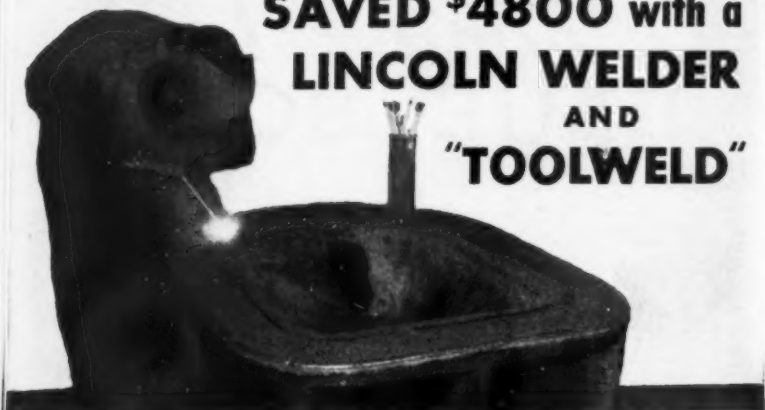
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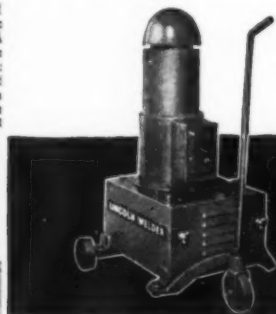
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THE TOOL ROOM

Is The

BOTTLE NECK

By George Gorton, Jr., Vice President
George Gorton Machine Co., Racine, Wisconsin

THERE is no getting away from the fact that the tool room in the die casting, forging, plastics, glass, and other great industries, whose production is based on dies or molds, is the bottle neck through which all orders for new products or from new customers have to pass. But it doesn't have to be a ketchup bottle neck. Modern equipment and an organization for handling the work along with speed and precision can enlarge it to a milk bottle neck.

The vastly increased use of dies and molds in present day industry has intensified the efforts of the product manufacturers to get them out of the tool room faster and cheaper. Machine tool manufacturers have cooperated by making available, considerable improvements and additions to the tools required for die and mold production. The high speed, precision milling machines specifically designed for tool room now have spindle speeds up to 12,000 r.p.m., enabling the operator to run at maximum efficiency, the small cutters of a few thousandths to $\frac{1}{8}$ -inch diameter required for fine mold work. These fast running cutters not only save time, but do a better job and go farther toward producing the mirror finish necessary for plastic molds. The precision spindles of today, made of alloy steel, running in sleeves of the same material, and on preloaded ball bearings insure true running cutters, and hence minimum cutter breakage and a long sustained accuracy. Tolerances of .001 in. are readily maintained where desired. Cutter changes can be made in a fraction of the time formerly required, by means of cutter spindle brakes that stop the spindles even at top speeds in

a few seconds, and lock them.

More efficient types of cutters with improved grinding machines and methods have speeded up removal of stock. Setting up and shifting of work in process have been greatly facilitated by large, easy reading micrometer dials on feed screws. The more notable of these improvements are examined in greater detail hereafter.

Die and Mold Duplicators

The most striking reduction in mold costs, while retaining and even increasing accuracy, have been made by tool rooms equipped the last few years with die and mold duplicators. The Gorton Duplicator (Fig. 1) is a super-



Fig. 1—Duplicating half of a clipper head die (Fig. 2) in KLS oil hardening

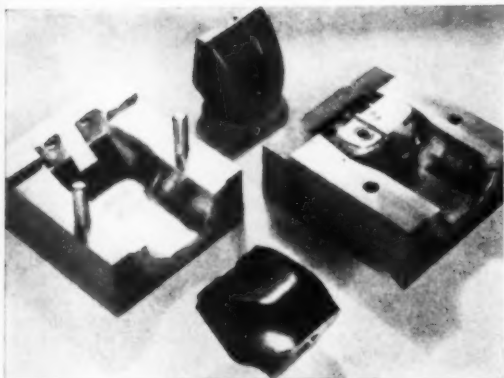


Fig. 2—These dies mold the Bakelite clipper head shown below them. The forming cavity for each half was reproduced on the Duplicator (Fig. 1) in 6 hours and the rest of the work done by ordinary milling.

speed, high precision vertical milling machine to which special equipment has been added. The duplicating equipment consists of an extra spindle and an extra table, which together with the usual miller spindle and table make up the Duplicator Head and Table for die and mold duplication.

The usual milling table holding the work and the milling cutter above it are seen at the left in Fig. 1. At the right are the duplicator table holding the model, and above it the tracer spindle. The tracer spindle is connected with the cutter spindle so that both will move up and down in unison, as the operator moves the vertical control lever with his left hand to keep the tracer bearing on the model. The Duplicator table and with it the miller table to which it is fastened moves very freely both longitudinally and crossways on a stream of balls as the operator causes the tracer to follow the shape of the model, by moving the Duplicator lever with his right hand. The milling cutter routs out the work

to the exact shape of the model and in the same size.

Duplicators are comparable in cost to milling machines. They pay for themselves in a very short time wherever they can be operated through the week on average die and mold work. On multiple cavity molds or many duplicate molds of the same pattern, the savings in time and tool labor cost are proportionate to the number of cavities or molds.

Plastic and Glass Molds

For instance, take the 9 cavity mold used to make the plastic bag ring (Fig. 3). This mold originally required 56 hours of tool labor per cavity, a total of 504 hours. After a Duplicator had been installed, succeeding molds of

this general pattern were made by tooling out the first cavity as usual in 56 hours and reproducing the other eight cavities on the Duplicator, using the first cavity as the model, in a time of 8 hours each. The reduction in tool labor from 504 to 120 hours saved 384 hours or 76%.



Fig. 3—The 9 cavity mold for this plastic bag ring was produced on a Duplicator in 120 hours as compared with 504 hours by ordinary die sinking methods.



Fig. 4—A new set of molds for this Milk of Magnesia bottle was produced on a Duplicator in half the time originally required.

Another case in point is the complete set of molds and blanks for the Milk of Magnesia bottle (Fig. 4). The saving in tool labor cost is often more than that shown by time comparisons alone, as the Duplicator does not require a skilled die maker. Any reasonably good machinist can learn to operate it and turn out accurate work in a very short time.

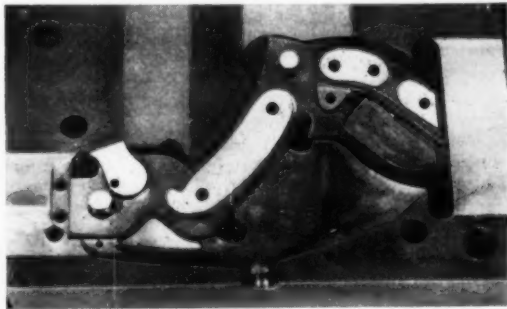


Fig. 6—Lower half of oil-hardened tool steel die for die casting coin chutes for vending machine. Production time over 100 hours reduced to 36½ hours with a Duplicator.

Much time can be saved on patterns of a repetitive nature, such as the glass dish shown with its mold in Fig. 5, cutting by hand methods only enough of the pattern to serve as a model of the design and then producing the rest of the mold with an indexing fixture on the Duplicator. This mold, 8-inch dia. by 3-inches deep was cut on a Duplicator in 26 hours, including 2 hours for set-up and grinding of tools. Sharp angles and steep sides can be followed with ease and speed on a Duplicator.

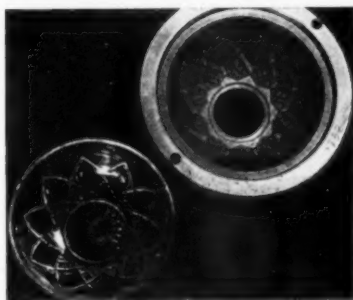


Fig. 5—Glass mold and dish. The mold was cut on a Duplicator in 26 hours, complete, using a small section of the design cut in cast iron as the model and indexing.

In fact Duplicators are capable of reproducing accurately patterns of any degree of complexity or irregularity without appreciable slowing up. They save therefore, a great deal of time on small intricate dies and molds requiring careful workmanship and close adherence to pattern. Cutters down to .030-inch can be run efficiently on fine work. The coin chute die (Fig. 6) is an example of such work. This die (lower half as shown) originally took over 100

hours of tool labor. Actual cutting time when placed on the Duplicator was 29½ hours. This included accurately spotting the ejector pin holes so as to permit drilling instead of jig boring. This die was made from two originals, one being used to produce the main cavity, the other to cut the gate. This required two set-ups totalling 3 hours, as extreme care was taken to insure accuracy. Grinding cutters and styles required 4 hours, making a total of 36½ hours to complete the die, which was held within plus or minus .001-inch (one-thousandth) in all dimensions, of the original. Certain sections of the die were held within .00025-inch. The smallest cutter was .070-inch diameter, the largest ⅜-inch, with tracing styles to correspond. Deepest tool marks on die



Fig. 7—Automobile piston core box half just as it came from the Duplicator. Reproduced in chilled cast iron from polished cast iron model in 2½ hours within limits of .001-in., for all dimensions.

were .0005-inch average .00025-inch. Spindle speeds ranged from 950 to 6,000 r.p.m. Gorton single flute cutters were used for the entire die.

The piston core box (Fig. 7) is an interesting example of the high degree of accuracy which can be obtained on

a Duplicator without any great sacrifice of speed. The flat faces and circular inside portions were first milled out, then two cuts were made on Duplicator, roughing with a single flute cutter and finishing with a special 16 flute ball nose cutter, ¼-inch diameter, removing in all about ⅜-inch of stock. In this way, 480 of these core box halves were reproduced in fast time and to the required close tolerances.



Fig. 8—The Duplicator cuts a small forging die from alloy steel in 1½ hours, using a stone composition model (under the tracer at right).

It is not always necessary to have a tooled out original when making duplicate molds. Stone composition models are frequently used for single cavity dies. These models are made by pouring a mixture of powder and liquid over an original pattern to make a cast. Either a male or female pattern may be cast, one from the other. This cast hardens about equal to marble without shrinking in 24 hours and can be drilled, filed, or finished with emery paper. Before placing under the tracing style it is coated with graphite or

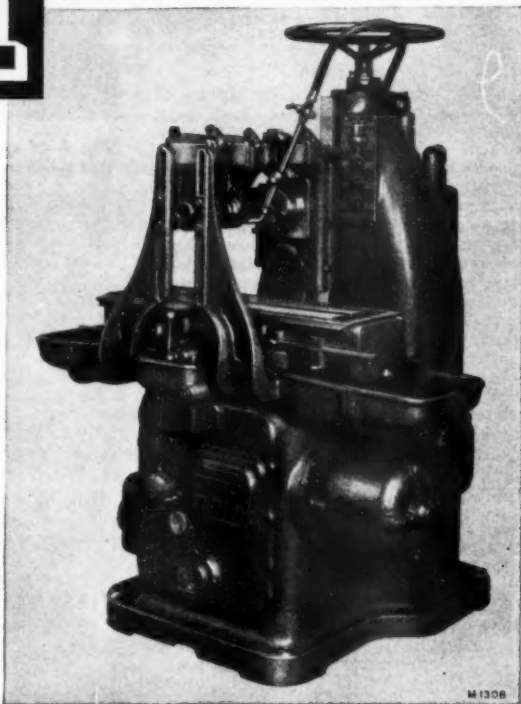
NUMBER 1

New

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Tool Grinders - Drilling and Centering Machines
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metallized. An instance of use of a stone composition model is shown in Fig. 8. Limits of plus or minus .005-inch were maintained on this small forging die. However, for intricate designs with sharp corners and angles or where high accuracy is required, a steel original is necessary. The enterprising tool shop foreman may sometimes save time and money on single dies by rigging up a master from brass templates to limit the lateral movement of the tracer and curved or shaped plates to guide the vertical movement.

Cutters

The selection of efficient types of cutters, properly ground and kept sharp, and run at their maximum speeds is exceedingly important in the production of the smaller and more intricate dies and molds. Single flute cutters from .1-inch to $\frac{1}{2}$ -inch diameter have proved to be far superior to any other types of cutters for finishing operations on Duplicators or Millers and for lettering and designs cut with Pantograph Engraving Machines. They are also used for roughing cuts on the more complicated dies. Single flute cutters possess greater strength (especially in the small sizes) and will stand higher speeds than any other type of cutter. They produce a smooth bottom cut and are easily resharpened or ground to other shapes or clearances. The low initial cost, combined with cheap resharpening and reduced losses through breakage, will result in savings of from 50% to 75% in cutter costs. Single flute cutters cannot, however, be ground properly on standard type of cutter grinders. The small additional outlay for a grinder which will grind single flute cutters, as well as the other types of cutters used for mold work, can be saved in a short time by the lower cost and greater efficiency of the single flute cutters and in reduced production time on the Duplicator or Pantograph machine.

Finishing cuts on molds reproduced on the Duplicator or Pantograph machine from stone composition models are often performed with ground tooth burrs, square or ball nose. Ground from the solid after hardening, not file

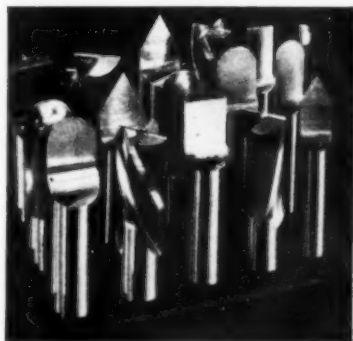


Fig. 9—A typical set of cutters for die and mold work, including single flute cutters with square, ball, and conical noses, two flute cutters with ball nose, four flute shear cut mills, and ground tooth burrs.

cut, these burrs are just as accurate, sharp and true as milling cutters. They are in fact, shallow multi-tooth mills. The multiple teeth bite into the work with less pressure applied to tracer against model, and the continuous tooth contact greatly reduces wear of tracer against model. Although specially adapted to cast iron mold and pattern work, burrs are also useful for finishing steel dies and molds.

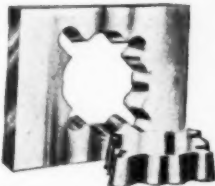
Roughing cuts involving the fast removal of stock over an area, are made to advantage with four flute shear-cut end mills in sizes above $\frac{1}{8}$ -inch dia. These shear-cut mills are unexcelled for side milling such as profiling contours, etc. The fast spiral provides continuous tooth contact, reducing chatter and breakage. Faster speeds are possible because the hollow ground teeth eject chips without clogging. Two flute, hollow ground, medium fast spiral cutters provide greater strength than the four flute shear-cut mills, and produce a fairly smooth bottom cut. These two flute cutters can be fed down into the work like a drill, and are good for roughing, slotting, etc. They are often preferred for some types of die and mold work to the

THE SLUG WAS USED FOR THE PUNCH

Here's a specific operation at Anderson & Sons, Springfield, Mass., Makers of Name Plates, Signs, Dials and Novelties.

The 2" thick die illustrated was cut at an angle so that the slug was used for the punch. Two parts cut at once saved time and steel. In addition the grain was the same way in punch and die. Starting hole was drilled at an angle, and work table tilted while sawing.

"A Day's Work in an Hour's Time" is recognized as the usual accomplishment of Contour Sawing, over drilling out the holes.



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The Anderson experience related above is typical. This new cutting process has been accepted as a fixed part of machine shop practice. Do-Alls are in use in leading industries—large and small—in Australia, Belgium, Canada, Czechoslovakia, China, England, France, Holland, Hawaii, Japan, Java, Mexico, Poland, Russia, Sweden, Switzerland, and South America.

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single flute cutters. All cutters; single flute, shear cut and two flute, should be of the short type for greatest rigidity. The longer lengths may cause excessive chatter and breakage.

For average work in steel, cast iron and brass, the best cutting tools are of high speed steel. The new hard alloy or carbide cutters are by far the most efficient cutters for soft, abrasive materials like bakelite and other synthetic plastics, hard rubber, etc. Tungsten carbide cutters are ideal for production work in cast iron, as for glass molds. The most efficient speed at which cutters should be run depends primarily on the material to be cut and the diameter of the cutter, and also on other considerations such as type and material of the cutter, spindle accuracy, rigidity, etc. The speed at which a $\frac{1}{8}$ -in. dia. single flute high speed steel cutter should be run, varies from 12,000 r.p.m., in Engraver's brass to 800 r.p.m., in very hard die and alloy steels. A reliable cutter speed chart should be consulted. It will save a good deal of time in getting experience. Tool men who are interested in getting the most recently published information on the use of die and mold cutters should send for a free copy of the Gorton Instruction Book 1385-A. This forty page booklet gives detailed and illustrated directions on the selection, grinding, and operation of small cutters. The properly equipped tool room will have on hand, a variety of collets and chucks for holding all types of cutters in the machine and for grinding. Tracing styles are best obtained in complete sets of 30 styles, which include all the sizes likely to be needed in both square and ball nose, arranged end up in a tray. The tracing styles should be hardened all over with shanks and ends ground.

Set-up and Adjustment of Work

Set-ups are made quickly and accurately on the modern die and mold Duplicators and high precision millers by means of the large, easy reading micrometer dials on all feed screws, including the spindle feed, and a precision micrometer depth stop at the front of

the spindle. The much reduced set-up time on these machines permits reproducing single dies at nearly as low a cost as quantities. Simple work is set up in a few minutes, a complex job requiring high accuracy in an hour or so. Built-in micrometers facilitate set-ups and permit the original die to be accurately shifted during reproduction, should slight changes in position of various sections be desirable on the new die. Similarly portions of several originals may be combined in the new die, or sections left off entirely. Holes for ejector pins, etc., can be located from the old die and spotted for drilling, thus eliminating in many cases a jig boring operation.

Finishing Operations on Molds

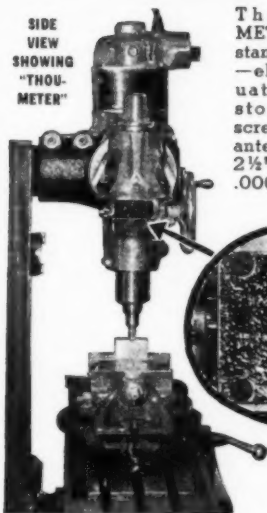
Small, accurately ground cutters driven at high speeds, leave a smooth finish nearly equal to a ground surface. This has brought about a considerable reduction in the time required for the laborious hand polishing operation. To obtain the mirror finish required for plastic molds it is not necessary to polish out more than .002-in., of stock to remove the worst tool marks, the average being around .0005-in., and often not more than .00025-in.

Advantages of the Die Duplicator

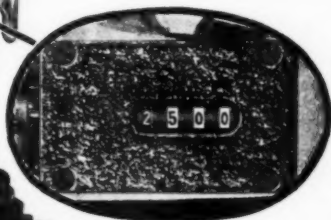
Most of the larger tool rooms and many small ones, which have been laid out or reequipped recently for die and mold work, have installed one or more Duplicators principally to obtain these advantages:

Faster production.—An operator on the Duplicator can reproduce dies and molds about twice as fast as a skilled machinist by ordinary methods. They are manually operated with the rate and direction of feed under the control of the operator at all times, hence the cutter is always operating at maximum capacity. The operator can feed in any direction with heavy roughing cuts, and then change instantly to a light cut over intricate design. The quick set-up time, the smooth finish left, reducing final polishing operations, and the elimination of the time ordinarily

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The "THOU-METER" gives instant zero setting—eliminates graduations, dials, stops, binding screws, etc. Guaranteed accuracy in $2\frac{1}{2}$ " travel $\pm .00025$ ".

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lost in consulting drawings are also factors promoting higher production.

Ease of operation.—The Duplicator does not require a skilled die maker or an operator especially trained on it, to run it efficiently. Any reasonably good mechanic can learn to run a Duplicator in a very short time. It does not tire the operator, who sits in an easy position with an unobstructed view of both work and master. The lever controlling the Duplicator table provides a leverage of 5 to 1 or greater against the cut, allowing heavy cuts to be taken with positive control and a minimum of physical effort.

High accuracy.—It is possible to maintain tolerances of .001-in., and even closer when needed. Moreover, the possibility of error is greatly reduced since it is not necessary to read dimensions or lay out work from complicated drawings. The operator works directly from the original die or master. The master may be an actual working die or a master made of brass, Bakelite, or some of the new stone composition materials.

General utility.—In many tool rooms the Duplicators, when not required for actual duplicating jobs, are used as fast, high precision vertical millers, and are found to be the handiest machines in the shop on small die and mold milling jobs. Tool men find particularly useful, the ease with which the table can be moved in any direction by a simple hand lever. This feature increases immensely, the facility with which complicated or irregularly shaped dies and molds can be handled.

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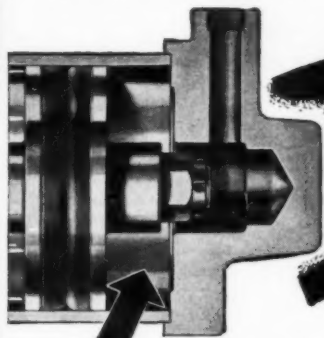
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Comments From The Editor

Imagination . . .

IN other days, the peddler plodded wearily across country, laden with a heavy pack. As he trudged through the towns, he rang a bell and shouted:

—"What do you lack?" (or its equivalent).

If a native **felt** the lack of anything, he accosted the peddler and acknowledged the lack. Then the peddler methodically unfolded his pack, exposed his wares and haggled over prices.

Such selling methods were frankly innocent of suggestion or imagination. Unless folks definitely **felt a lack** they didn't buy.

Farther along in the scheme of things, folks with imagination began to realize that people could be coaxed, persuaded, educated to feel the lack of things. Desire and need for things could be awakened and stimulated by word of mouth, by exhibition and demonstration — by the printed page. Suggestions of the desirability and advantage of using certain devices and products were implanted, nourished and developed. Strong appeals to imagination created demand by impressing folks with the time and labor they could save—the greater comfort and wealth they could achieve — the increased enjoyment, happiness and satisfaction they could derive from use of the new products.

Suggestion and imagination paved the way for our modern mass production and mass selling.

The vital spark of imagination marks the distinction between the peddler of today and the real salesman.

The plodding peddler stumbles in apologetically with a "What do you lack?" query and is soon on his way.

The successful salesman makes you feel the acute lack of his product — builds up your realization of need for it — makes you feel that you'll gain materially in some way by using it — and then you give him the order.

Imagination figures in the creation of successful advertising copy. The writer must pack a real buying urge into it. Art, balance, attention value catch the eye but they do not unfold the pocket-book. What rings the cash register is copy that fires an appeal to the reader's imagination—that cranks-up his mind and jolts it into picturing the overwhelming advantages of using the product.

There have been many arguments over advertising copy. We see many beautiful examples of art work adorning pale or passive advertising messages. What really brings in the orders is neat but not gaudy copy—that attracts attention in a nice way—copy that rings with sincerity and compels the reader to start thinking in terms of buying and profiting through use of the product.

Copy of that kind—placed judiciously and repeated consistently with sufficient variation to avoid monotony—that's the road to advertising success.

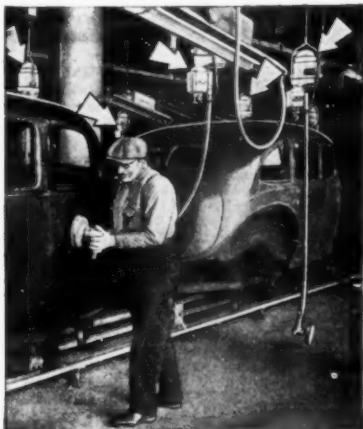
Roughly, men may be divided into three classifications—the wise, the partly wise and the foolish. The foolish man seldom learns anything. The partly wise man learns from his own experiences. The wise man learns from the experiences of others, as well as his own.

Call the day a blank when you don't learn something new about your job.

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Scene in a Detroit Auto Plant showing a battery of MALL hanger bail units polishing auto bodies.

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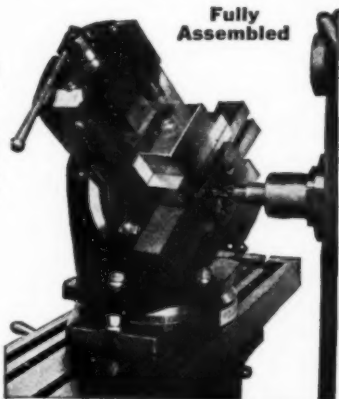
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WHAT'S NEW *in the industry*

by Wesley G. Paulson, Editor

Dreis & Krump Brake For Long Sections

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill., announces a press brake for forming sheet metal sections of 20 foot lengths in one operation.

This machine has been developed to meet the needs of aircraft, bus body, railway equipment, and other industries requiring sheet metal sections formed in long lengths.

Machine illustrated is 16 ft., 6-in., between housings with bed and ram 20 ft., long with a capacity of 10 gauge material. This machine forms bus body guard rails of 16 gauge steel, and bus belt rail sections of 14 gauge steel. Both sections involve multiple bends and are made in 20 ft., lengths in one operation.

The non-deflecting bed minimizes springing and permits the forming of such sections straight and true over their entire length.

The weight of the machine is 51,000-lbs. It is powered by a 15 h.p. motor, which drives the flywheel through "V" belts. Housings, bed, ram, and top leaf are constructed of steel plates.

Steel gears are used throughout.

New features include air counter-balance for ram and air-operated friction clutch. Speed of operation is 30 strokes per minute.

Press Brakes in this length can also be furnished in capacities up to $\frac{1}{4}$ -in.

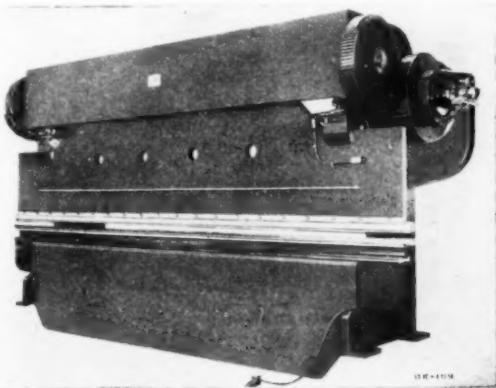


plate.

Please address the makers for further information.

Streamlined Niagara Presses

A new line of streamlined punch presses has been added to the complete series of presses built by the Niagara.

Steel casting frames are scientifically designed for strength and rigidity. Gearing, clutch, flywheel, V-type drive and motor are all enclosed within the frame.



The gearing and sleeve clutch are enclosed in a separate compartment within the frame and operate in a bath of oil.

Accessibility to all enclosed working parts is provided by a removable steel plate at the rear of press.

Niagara 14-point engagement sleeve clutch with built-in single stroke mechanism is standard equipment.

Gearing is of steel and mounted on anti-friction bearings. All gears are supported between bearings eliminating overhang.

Strong box section flanged slide operates in adjustable multiple V gibs. Slide is driven by a large overhead eccentric and steel connection. Slide is equipped with knockout.

Treadle is guarded for operator's safety.

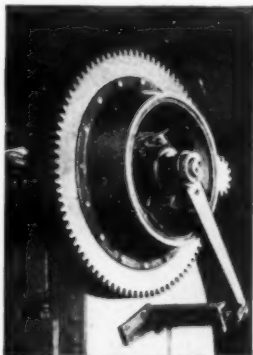
Complete information may be had by writing the Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y.

Industrial Punch Press Friction Clutch

A friction clutch, known as the Servo-Action Punch Press Clutch is being offered by the Industrial Clutch Co., Waukesha, Wis., for application directly to the crank shaft of punch presses. This new clutch combines a friction cone clutch with a servo-mechanism in an original patented design. It is said to hold over a quarter-million inch-pounds torque with no greater spring or treadle pressure than required by a jaw clutch.

The design combines the shockless, instant engagement and durability of the friction clutch with the positive, simple operation of the jaw or pin clutch. Users report a large increase in production, particularly in blanking, as the clutch engages instantly at any point on the cone when the treadle is pressed, and permits the press to be driven at as high speeds as the dies will allow.

Engagement is asserted to be smooth and without shock, resulting in easy operation with minimum maintenance



and time out for repairs or adjustment.

The Servo-mechanism of co-acting helical spines, one keyed to the crank shaft, the other forming part of the cone, utilizes the high torque loads of the press to boost the pressure be-

tween the clutch surfaces high enough to transmit any torque that the press is able to handle. Depressing the foot treadle starts engagement of the clutch by spring pressure, through a cam and roller latch mechanism, the same as with a jaw clutch. This pressure is just sufficient to overcome the inertia of the crank and ram and the friction on the band brake.

The Servo-mechanism then automatically comes into action to bring the clutch into high pressure engagement, for transmitting full momentum of the fly wheel or other driving parts to the ram.

With completion of the punching operation, the clutch surfaces are released from high pressure engagement and a roller cam at the top of the ram stroke completes disengaging.

The clutch elements may be temporarily connected to rotate in either direction for changing or setting dies. Adjustments are readily made for taking up wear of facings, and the facings may be quickly replaced when worn down after long use, without dismantling the press.

The clutch is built in capacities to suit specific applications, and is not a stock product. It is recommended for incorporation by the punch press manufacturers, in presses designed with this type of clutch in view. It is not recommended as a replacement for jaw or pin type clutches on presses now in use.

In writing the makers for further information please mention The BLUE BOOK.

Machinery Group Meeting

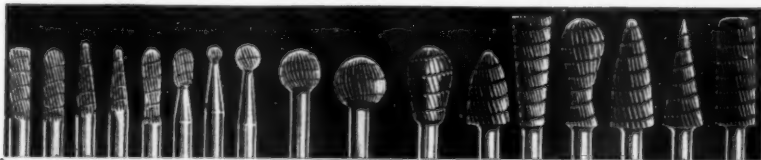
To serve industry to better advantage in its foreign trade problems, the National Foreign Trade Council, Inc., is preparing to conduct a number of group discussion meetings at the annual Convention to be held at Hotel Commodore in New York, October 31, November 1 and 2. One of these group meetings will be devoted to the foreign trade interests of the machinery industry.

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MADE TO ORDER IN ANY METAL

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BROOKLYN, N.Y.

Write for
Illustrated Catalog



HAMILTON MILL CUT ROTARY FILES

BETTER . . . because of superior steel! . . . precision milled to a fine sharp edge. Teeth have a positive rake which insures a milling action—not an abrasive, frictional removal of metal. We solicit your inquiries on special as well as standard shapes and sizes. Try them and notice the difference.

THE HAMILTON TOOL CO.,

HAMILTON, OHIO

Ex-Cell-O High Capacity Step Drilling Units

Automatic multiple-spindle step drilling, using a single hydraulic power unit—or automatic step-drilling of long and relatively large diameter holes, is said to be possible for the first time through development of an interesting hydraulic control mechanism by Ex-Cell-O.

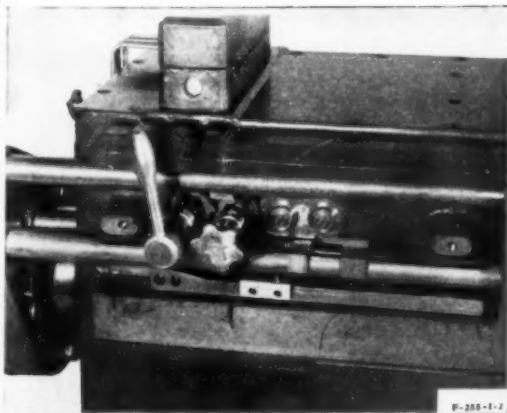
The new unit is available with either the Ex-Cell-O 23A or 25A hydraulic power units, with certain minor modifications—which may be made in the field—can even be applied to similar hydraulic units already in use.

The step-drilling unit consists of a feed bar moving with the spindle, a stationary positioning bar, a sliding dog for positioning the action on each step, held on the feed bar under spring tension; and an adjustable hydraulic timer for regulating the depth of cut in each step.

In operation, as the machine is started and the drill approaches the work, the sliding dog trips the main operating control, starting the action of the hydraulic timer. When a pre-determined depth of hole has been drilled—depending on the setting of the timer, the spindle and feed bar retract, the aforementioned sliding dog return-



TANNEWITZ
24" Hi-Speed Band Saw
SAWS NEARLY EVERYTHING
 Including Wood, Sheet Steel, Brass
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 1½ H. P. Direct Motor Drive.
 Also 30"-36"-42" Sizes.
TANNEWITZ WORKS, GRAND RAPIDS, MICHIGAN



ing with the bar to a new position.
 A fixed dog on the top feed bar

"Buy Economy — You'll Effect Economy"



**SOCKET HEAD
CAP SCREWS**

*Milled
from Bar*



**HOLLOW
SET SCREWS**

*Made of
Alloy Steel*



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Version ALLSTEEL PRESSES

embody such advanced features as—

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SHAFTS TO
BEND OR
BREAK.
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FINED WITHIN
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EQUAL TO
DISTANCE
BETWEEN
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5. ALL GIBS ARE
ADJUSTABLE
AND BRONZE
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BUSHED;
BACKSHAFT
OPERATES IN
ANTI-FRICT-
TION BEAR-
INGS.

Through the use of VERSION PRESSES die life is increased and maintenance costs are reduced. They are available in capacities up to 5000 tons and are built by the ORIGINALS OF ALL STEEL WELDED CONSTRUCTION IN THE MANUFACTURE OF PUNCH PRESSES.

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VERSION ALLSTEEL PRESS CO.
9303 So. Kenwood, CHICAGO, ILL.

now trips the hydraulic unit in rapid approach to the feeding position. The sliding dog then trips the operating control, starting the automatic timer, and throwing the unit into drilling-feed as the previous depth of cut is reached.

The depth of each step of the complete drilling operation is adjustable by setting the automatic timer. The hydraulic step-drilling device is removable or replaceable on the Ex-Cell-O hydraulic power units in a matter of 15 minutes, so that the power units themselves can be used interchangeably for either step drilling or straight drilling, reaming, countersinking or spot facing.

Since the step-drilling control attaches directly to the power unit, it may be applied whether the unit is to be used for drilling of single holes up to say, one inch diameter, or a number of smaller holes through the use of multiple spindle heads driven from the hydraulic power unit.

Illustration shows closeup of EX-CELL-O hydraulic power unit with

cover removed to show feed bars, dogs, and control mechanism for step drilling.

For further details, please address EX-CELL-O Corp., 1180 Oakman Blvd., Detroit, Mich.

Stanley "Victor" Bench Grinder

A new No. 66 "Victor" Bench Grinder, with $\frac{1}{4}$ h.p. motor, full ball bearing, 6-inch wheels, is now offered at a very reasonable price by Stanley Electric Tool Division, New Britain, Conn. The new grinder is particularly suited for general grinding, sharpening tools, buffing, polishing and wire brush work in garages and factories.

Finished in gray enamel, the No. 66 is equipped with sturdy wheel guards, tool rests, toggle type switch, three-wire rubber covered cable, rubber feet, two grinding wheels 6 inches in diameter,—one coarse and one fine.

Address the makers for catalog page giving full information — and please mention The BLUE BOOK.

GREENERD Arbor Presses

For assembling, broaching, piercing, keyway cutting, oil grooving, straightening, pressing, molding, and many similar production operations.

Sixty-five standard styles and sizes, manually operated presses from $\frac{1}{4}$ to 35 tons pressure. Motor driven Hydraulic Presses from $1\frac{1}{2}$ to 15 tons.

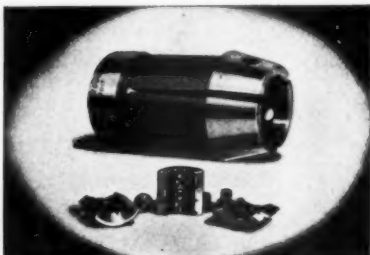
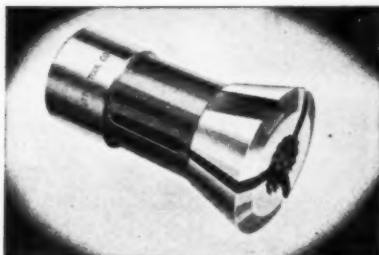
The Originators of the Arbor Press

Greenerd Arbor Press Company

141 Crown Street • Nashua, New Hampshire



QUICKLY RECOGNIZED



Sutton DIAMOND-GRIP Collets

◆ ◆ ◆ ◆ ◆ You can always recognize a Sutton DIAMOND - GRIP Collet at a glance. Its clean-cut diamond-shaped serrations are an exclusive and distinguishing feature.

◆ The performance advantages of DIAMOND SERRATIONS are also quickly recognized by production managers responsible for the cost and quality of screw machine products, and also by the operator of the machine.

◆ DIAMOND SERRATIONS grip tighter under less tension, clear themselves of dirt and chips, and cut down spoilage due to slipping.

◆ Sutton DIAMOND-GRIP Collets are made for all screw machines in three styles: Single-piece, Master, and Compensating Master for hot-rolled stock. The Sutton Catalog of screw machine accessories gives complete listings.

COUPON 16 Will save you time and bring a Sutton Catalog by return mail.

SUTTON TOOL CO. 2842 W. Grand Blvd., DETROIT, MICH.



Only Sutton Diamond-Grip Collets are Diamond - Serrated

Rotex Quick Change Punch

A series of punches and a shear, mounted for instant use, are embodied



in the Rotex Quick Change Punch, offered by the Ward Machinery Co., 564 W. Washington Blvd., Chicago, Ill.

Designed especially for sheet metal work, this new tool is especially useful for sheet metal contractors, airplane shops, electric sign shops and wherever sheet metal is worked.

The quick change feature allows instant selection and use of the required tool. In the case of the Model 18, illustrated, 17 punches and a 2-inch shear are always available. The punches include 5/32, 3/16, 7/32, 1/4, 9/32, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 7/8, 1, 1 1/8, 1 1/4, 1 1/2 and 2-inch sizes. Depth of throat is 18-inches. Capacity according to size, 10 to 18 ga., shear is 12 ga., and odd shaped holes.

The model 10 mounts 9 punches and a 2-inch shear. The punches range from 5/32 to 2-inches. Depth of throat is 15-inches. Stated capacity, according to size, for 12 to 20 ga., shear is 14 ga., and odd shaped holes.

Quickmail Coupon No. 14 will bring full information and prices.

ARTCO



Send for our catalog showing a great variety of shapes, sizes, types and cuts. There is an "ARTCO" tool for every job.

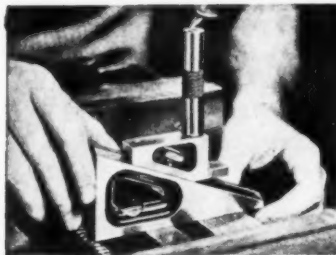
AMERICAN ROTARY TOOLS CO.

44 WHITEHALL ST.,

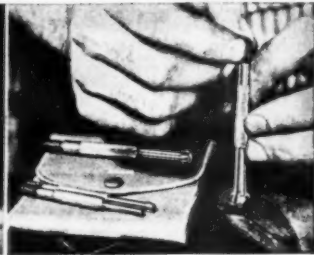
NEW YORK, N. Y.

Look 'em over!

THEY'RE THE LATEST IN PRECISION TOOLS
AS FEATURED BY **STARRETT**



A precision Planer and Shaper Gage, No. 599 has a range of $\frac{1}{4}$ to 9 inches. Alignment and parallelism of ends, slides and work contacts is held to close limits and lateral play is eliminated. Note built-in level.



No. 829 fills a need for practical, inexpensive gages for small holes. Four gages cover a range from $\frac{1}{8}$ to $\frac{1}{2}$ inch. Quick adjustment and sensitive contact makes it easy to feel small hole dimensions accurately and transfer to a micrometer.



No. 828 Center finder or "Wiggler" takes care of countless operations requiring accurate location of working points in jig and tool work, with milling and vertical machines, drill presses, etc. Point is spring cushioned for protection, is easily brought to concentricity with machine spindle and telescopes into body when not in use.



Flexibility combined with accuracy and an unusually low price make the No. 564 "Universal Junior" a real bargain. Ball contact can be set at any angle and rotated in friction sleeve. Indicator can be mounted on side or top of shank or on height gage. Graduated scale always positioned for easy reading. Range .012 by thousandths.

For complete description, prices, etc., see new Starrett Catalog No. 26 "K". Write for copy.

THE L. S. STARRETT CO., ATHOL, MASS., U. S. A.

World's Greatest Toolmakers — Manufacturers of Hardware Unexcelled — Steel Tapes Standard for Accuracy — Dial Indicators for Every Requirement

Standardize on
STARRETT TOOLS
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Sundstrand No. 0 Rigidmil

Speed, easy setup, high production, maintained accuracy, and economy for a host of small milling operations—these are some of the claims for the new No. 0 Rigidmil.

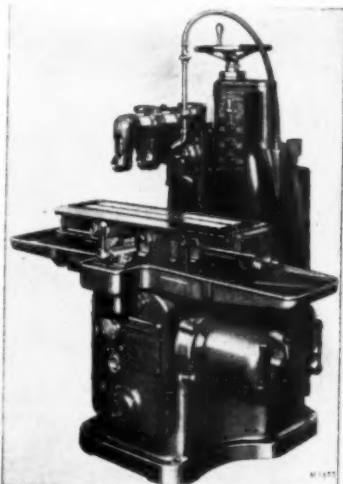
Easily adjusted dogs control automatic cycles to meet the practical requirements of conventional or climb-cut milling.

Hand feed is often preferred for certain light milling operations. On such work the unit with hand feed is said to offer the same wide range of spindle speeds as the hydraulic feed type with the same high accuracy, ease of handling, and stamina.

Both units have the same integral base column casting. Working surface of table is 8 x 30 inches. Maximum table travel is 14 inches. This can be obtained in a continuous movement by means of a hand wheel or in adjustable units of four inches through a 90 degree movement of the powerful hand lever. Hand feed to spindle head is lever operated in adjustable units of two inches within a total distance of

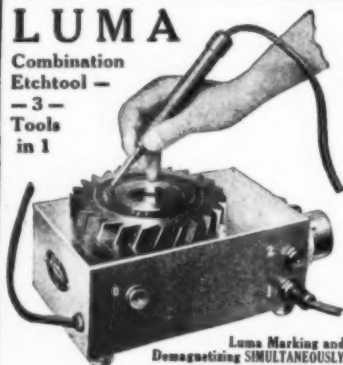
10½ inches.

In other respects such as spindle, spindle head, spindle speed range, over



LUMA

Combination
Etchtool —
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Luma Marking and
Demagnetizing SIMULTANEOUSLY

Writes on hardened steel — demagnetizes at the same time—with carbon point does light spot annealing and soldering jobs. Compact—easy to use—dependable.

Send for details—5-day FREE TRIAL OFFER!

Luma Electric Equipment Co.
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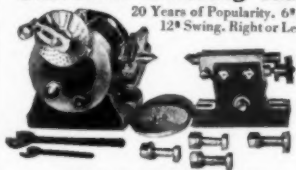
arm, coolant pump, and distributor, the hand feed unit is exactly like the hydraulic feed machine of the same size. In fact, the hydraulic feed may be adopted at any time simply by installing the necessary equipment.

A new eight-page bulletin No. 382 gives complete information on these units together with specifications.

Copies may be had by addressing the Sundstrand Machine Tool Company, 2540 11th Street, Rockford, Illinois, and mentioning The BLUE BOOK.

CARROLL Universal Dividing Heads

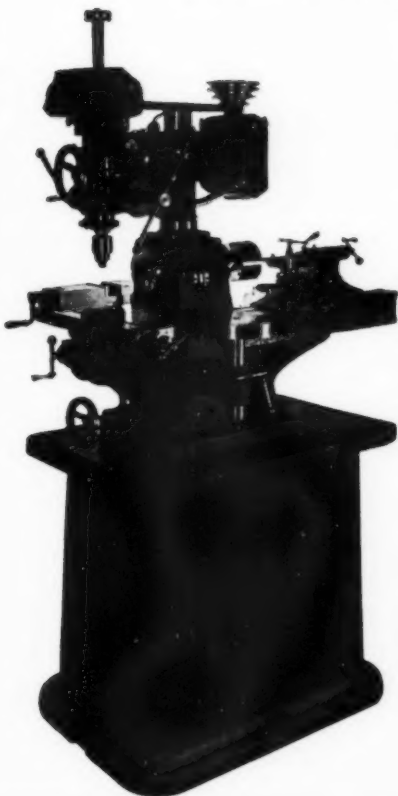
20 Years of Popularity. 6", 10½"
12" Swing. Right or Left Hand
Type.



WM. CARROLL & SON
1776 Lexington Ave., (Norwood) Cincinnati, Ohio

New! The GILMAN Combination 4 - IN - 1

Precision Lathe—Vertical Mill—Horizontal Mill—Sensitive Drill
Tool Room Machine



A real contribution to speedier, better, lower cost production in tool rooms, tool and die shops, research and experimental laboratories. It combines:

A precision lathe with 9" swing; is 12" between centers with a 24" bed. Tail stock is adjustable to take up wear. An attractive feature is the patented device for instant clamping of the compound rest at any position on the lathe bed.

The horizontal mill has a 4x18" table, with 10" travel.

The horizontal mill and lathe are powered by a reversible motor of one h. p. capacity, mounted in the base. There are eight spindle speeds of from 80 to 2500 r. p. m.

The vertical mill is provided by swinging the drill head around and locking it over the milling table. The quill may be raised or lowered 4".

The sensitive drill has an 8½" table with 7½" between table and spindle. A Jacobs chuck is provided.

The sensitive drill and vertical mill are powered by a ½ h. p. reversible motor and spindle speeds range from 390 to 2200 r. p. m.

Timken bearings are used throughout.

Vimcolighting assures proper illumination of work.

All of the above units are designed for precision work.

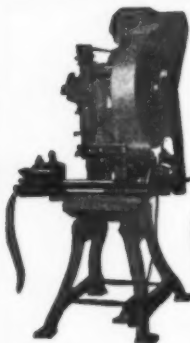
The machine weighs approximately 1,000 lbs., and is finished in an attractive fine baked Art Metal finish.

*For complete information, please
use Quickmail Coupon No. 49.*

**Gilman
Engineering Works
Janesville, Wisconsin**

WITTEK

AUTOMATIC ROLL FEEDS



**for Every
Size and
Make of
Punch Press**



**FAST — ACCURATE !
SAFE — AUTOMATIC !**

WITTEK Roll Feeds will protect you and your operators. Presses are kept operating up to capacity—feeding any stock from coils in lengths up to 24" per press stroke—saving in time, dies and production costs. Single roll, double roll and compound types with straightener—fits any press without alterations.



WITTEK Reel Stands—6 models—enable one man to center heavy coils. Ball bearing mounted—adjustable to any height—balanced at any angle—500-lbs. capacity.

Send for Bulletin "HF" giving complete details.

A size for every requirement.

WITTEK MANUFACTURING CO.
4305-9 W. 24th Place. Chicago, Ill.

Hammond Combination Grinder and Polisher

The Hammond Machinery Builders, Kalamazoo, Mich., present a new type "O" Combination Grinder and Polisher. It is an overhanging spindle machine and is especially desirable for large bulky work where extra space around the wheel is at a premium.

The top section overhangs 12½-inches from the lower front of the base. Spindle is 52-inches long overall and the grinder end is equipped with a 14-inch diameter guard.

Standard equipment includes:



Combination switch and brake enabling the operator to shut off motor and spindle instantly.

Spindle lock which holds spindle securely when changing wheels.

Automatic motor starter with overload and low voltage protection.

Motor in the base with multi-V belt drive.

This combination machine will not only be of particular interest to those handling bulky work, but where there is not enough production to warrant a single purpose grinder and polisher. In many plants it will serve the purpose of two machines.

For particulars, write Hammond Machinery Builders, 1614 Douglas Ave., Kalamazoo, Michigan.

Tomorrow's Drive . . .

For All Machine Tools

SCHULTES 4-SPEED UNITS

for

**SHAPERS,
LATHES,
MILLING MACHINES,
DRILL PRESSES,
PLANERS, ETC.**

You can apply Schultes Modern Drives easily and quickly to all types of machine tools. The illustration shows a typical Shaper application.

Schultes Drives give the same easy, fingertip speed control that you enjoy in your car. A single, easily reached lever instantly provides any of four different speeds. With a two-speed motor, eight speeds are available.

Schultes Drives are safe. There are no belts to change by hand. All moving parts are enclosed. A convenient hand wheel permits rotation of machine spindles for set-up work.

Schultes Drives are efficient. Ball and roller bearings are used extensively. The ball bearing motor is rigidly connected to transmission housing and coupled with a solid keyed sleeve. Hardened and ground gears and shafts operate in oil bath in a sealed housing.



If you're interested in increasing production . . . reducing production costs and improving your products . . . rendering your machine tools more flexible in operation and location, you'll make no mistake in investigating the advantages of Schultes Drives.

Quickmail Coupon No. 19 will bring complete information.

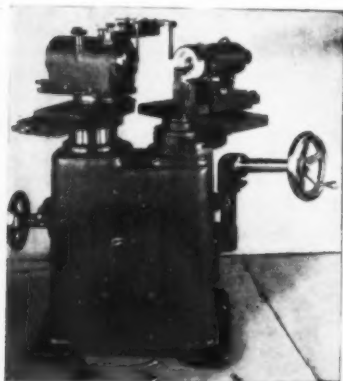
**BLACKSTONE
TOOL & MFG. CO.**

**11113 Outer Drive, West,
Detroit, Michigan**

Oliver Face Mill Grinder

The Oliver Instrument Co., Adrian, Mich., announce a new No. 2 ARC Face Mill Grinder.

The new machine has many improve-



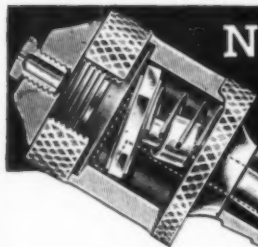
ments over the previous model. The frame is heavier and provides a more rigid support for the work head and grinder head. Important changes have been made in the work head and slides making the setup easier in a change from right to left hand cutters. A new type of rigid lip rest is used and many minor improvements are included.

The machine has a capacity for grinding face milling cutters from 6 to 26-inches in diameter, grinding face, corner and periphery at one stroke of the wheel. Different clearance angles may be had for face and periphery and any radius of corner from 0 to 2-inches.

Channeling cutters may be ground in two operations, once set as a right-hand cutter and once as a left-hand cutter.

Smaller cutters, such as shell end mills, etc., may be ground with a round corner at one setting by using an auxiliary spindle which can be added to the machine.

A new 8-page bulletin gives full information. In writing kindly mention The BLUE BOOK.



No Other Air Valve has this Enclosed Ball & Socket Joint with Actuating Lever

Only Air-O-Chek Air Valves have the unique ball and socket joint with enclosed actuating lever that gives a big FREE

FLOWING volume of air with slight flex of the hose. Instant, positive shut-off when hose is released. No protruding buttons or levers. No packing glands.

Thousands in Use

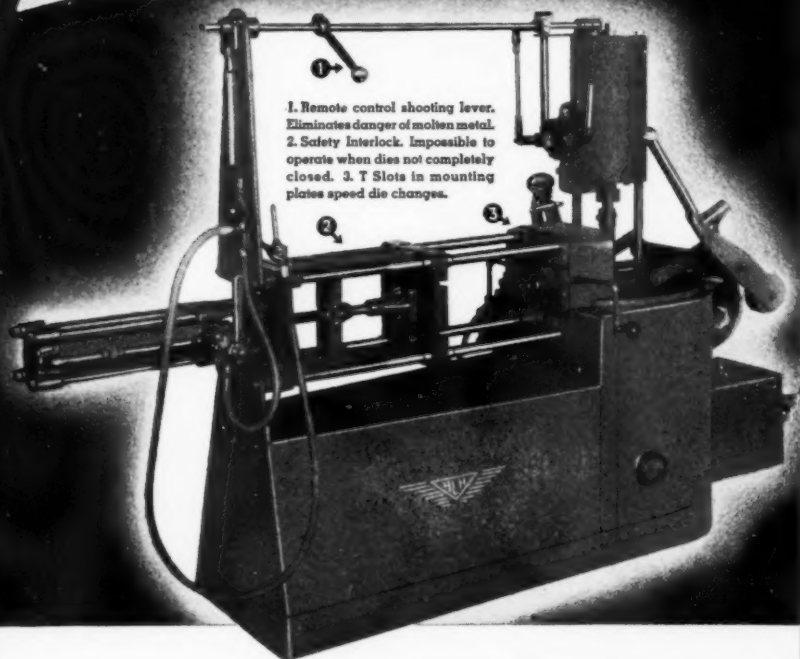
Air-O-Cheks are standard equipment in many leading factories. One company uses 1900 — another more than 1000. Actual use proves they are totally different and better. Order sample on 30 days approval and judge for yourself.

AIR-WAY PUMP & EQUIPMENT CO.

625-S W. Jackson Blvd.

CHICAGO

FUEL COST 12¢ PER HOUR



1. Remote control shooting lever.
Eliminates danger of molten metal.
2. Safety interlock. Impossible to
operate when dies not completely
closed. 3. T slots in mounting
plates speed die changes.

- And Harvill Hi-Pressure Die Casting Machines save all along the line... Lowest original cost... Operates with inexperienced labor... Turns out clean, accurate castings fast.
- Put that farming-out profit in your own pocket. Learn now how Harvill can save on your present needs. Harvill's die-making service will furnish you dies of your own products. Mail us your print or sample today. No obligation for estimate. Catalog on request.

H. L. HARVILL, INC. • 2344 E. 38th Street, Los Angeles, California

HARVILL
HIGH-PRESSURE
CASTING MACHINES

*Yours
FOR THE
asking!*

...a 30% to 75% saving in tool costs, by having your worn out or obsolete tools made over by RENU—and guaranteed as good as new, both for appearance and performance.

● A new sixteen-page book that tells the whole story is available, write.

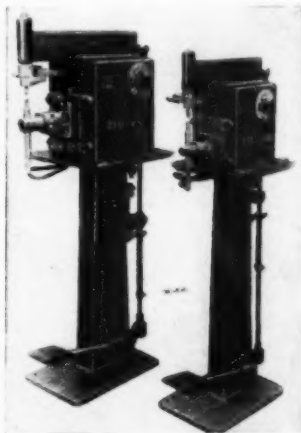


Renu TOOL COMPANY

275 E. MILWAUKEE AVENUE • DETROIT

Eisler Vertical Type Welders

The demand in recent years for precision spot welding in which the fulcrum type spot welder cannot satisfactorily answer the purpose, has led to the development of a complete line of vertical type welding machines by the Eisler Engineering Co. of 762 So. 13th St., Newark, N. J. Extreme accuracy



in the spot welding of parts used in the manufacture of typewriters, adding machines, clocks, check writers, safety razors, precision toys, etc., is assured by the plunger action of the upper electrode of the vertical machine, and welds of uniformity and strength result.



HANDY RACKS

Save More Space Than Other Racks Waste

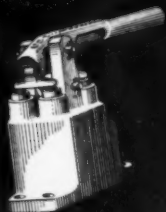
Man-height. Two stands, placed back-to-back without wasting space, form a double arm set.

Shipped on approval if you wish. Write today.

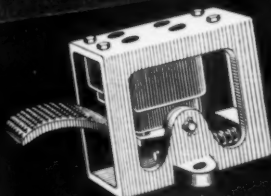
Wm. S. Yohe Supply Co.
503 Mahoning Road, N. E.
CANTON, O O

ROSS *Air Control* VALVES

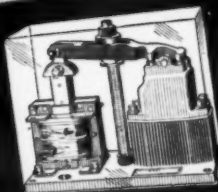
are
**STURDILY
BUILT**



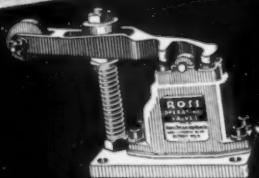
HAND CONTROL
All working parts made of hardened steel for
maximum service. Piston of hand valve made
with oil resistant rubber lining. Heavy base for



FOOT CONTROL
Piston of foot valve is heavy hardened steel and
ground up under the foot pedal and foot pedal
handles is extremely accurate.



SOLENOID CONTROL
Over the solenoid for installing service. Extra heavy
base for mounting purposes. Heavy bonded metal
protecting cover. Operates lever and gate in
most severe demands.



MECHANICAL CONTROL
Designed for service and for operating for years.
Handled under the maximum pressure. Heavy
to most extreme conditions.



THE BRIDLE FOR
AIR HORSEPOWER

REGARDLESS of type or size, or the use to which they are put, Ross valves are all fundamentally alike, all sturdily built. Heavy bronze cast body with walls much thicker than usually considered necessary, each individual part designed with an extra strength factor which provides many years of dependable service—under severest conditions. For that unfailing service install Ross valves on your air-actuated equipment.

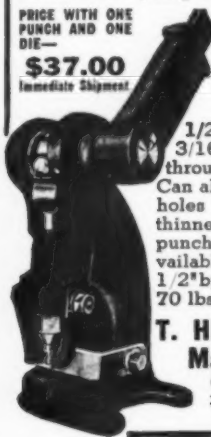
Send Quickmail Coupon No. 61 for Catalog No. 37.

ROSS OPERATING VALVE COMPANY
6480 Epworth Boulevard • Detroit, Michigan

T. H. L. FRONT LEVER BENCH PUNCH

Built for hard, tough work — die cannot lose alignment with punch — all parts interchangeable.

PRICE WITH ONE PUNCH AND ONE DIE—
\$37.00
Immediate Shipment.



Capacity —
1/2" holes through
3/16" steel; 13/32"
through 1/4" steel.
Can also be made for
holes up to 7/8" in
thinner metal. Stock
punches and dies available from 1/16 to 1/2" by 64ths. Weight, 70 lbs.

**T. H. Lewthwaite
Machine Co.**

(Est. 1890)
311 E. 47th St.,
NEW YORK

Where more accurate results are desired, these machines are supplied with timers and contactors.

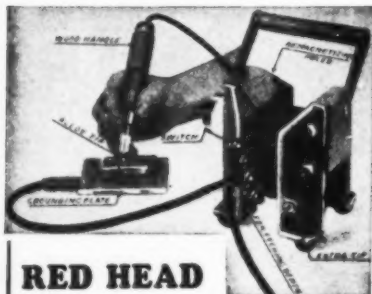
Ranging in size from 1 to 35 KVA, these machines are supplied in foot, air, or power operated models, depending on the class of service for which they are intended. Either bench or pedestal models are available.

The illustration shows two vertical types of welders in the smaller sizes. One is a five KVA model, and the other a 10 KVA job. These machines are especially adaptable where studs and lugs are to be accurately welded to sheet metal without the drilling of holes.

A typical application is their use in welding electrodes to spark-plug shells. It is essential that the welding operation be precisely performed. A suitable fixture, together with the vertical action of the upper electrode of the welder accomplishes the desired result.

A standard single phase welding transformer provides the welding current. Six points of heat regulation are obtainable with the dial control, mounted on the side of the fabricated case.

These machines are said to be easy to operate, are economical in operation, and require no maintenance.



RED HEAD

ETCHERS and DEMAGNETIZERS

Let us tell you the many advantages of our new D. C. and A. C. models now available. Also, see our new line of Magnetic Parallels and Midget Chucks.

Send TODAY for latest circulars

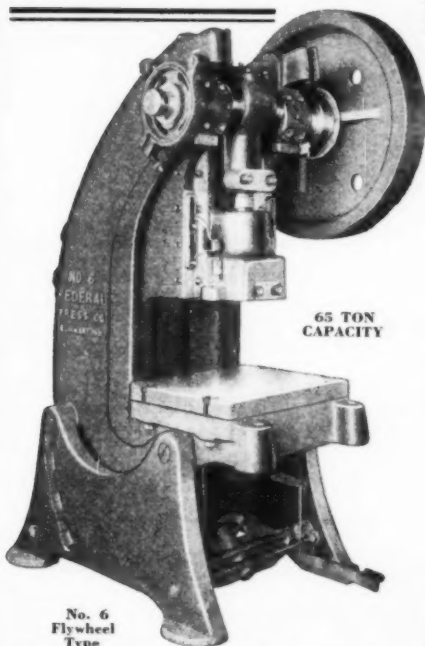
PRINTZ ELECTRIC CO.

14595 KENTUCKY AVE.,
DETROIT, MICHIGAN

New Acheson Bulletins

The how and why of the graphoid surface is the latest subject discussed in the technical series of the Acheson Colloids Corporation, Port Huron, Michigan. Readers interested in the theory and application of non-oily yet unctuous graphite surfaces may apply direct asking for Bulletin 220.4.

Folder 626, also available, covers the treatment of screw threads with colloidal graphite. How this product aids the tightening of screws, reduces galling, minimizes corrosion and eases later removal in thread assemblies is fully discussed.



No. 6
Flywheel
Type

65 TON
CAPACITY

All models of Federal heavy duty presses are equipped with Timken roller bearings. Flywheel roller bearings are adjustable for wear—eliminating expensive rebuilding and repairs after long service and preventing damage to the clutch and control mechanism. Non-repeat safety type clutch and tripping device are also standard equipment—safeguarding against accidents to operators or dies in the event momentum should carry the crankshaft beyond center.

Send Coupon No. 32 for illustrated circular giving full information.

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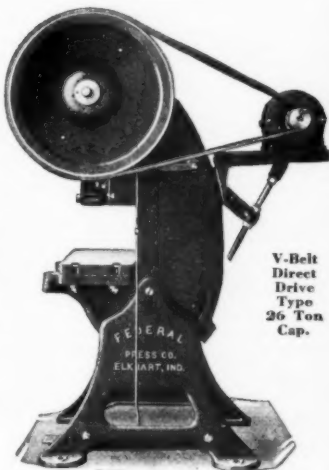
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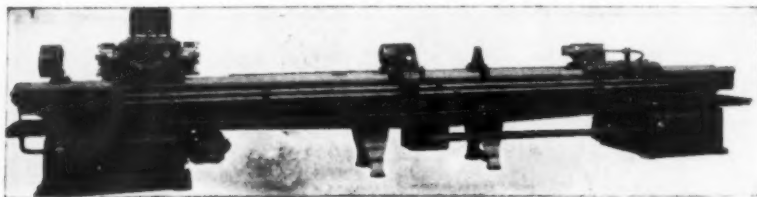
Just a few of the many sound reasons why your press equipment should be—

FEDERAL



V-Belt
Direct
Drive
Type
26 Ton
Cap.

No. 3



A New LeBlond Lathe

A new deep hole drilling, boring, and reaming lathe is announced by the R. K. LeBlond Machine Tool Co., Cincinnati. The new unit was designed not only to meet the government's gun boring requirements, but also to qualify for dozens of applications in the industrial field, such as, boring holes for hydraulic cylinders, oil well casings, and similar uses.

For government requirements, the lathe will handle stock 96-inches long, 5¼-inches outside diameter, and will

bore a hole a maximum diameter of 1½-inches. For industrial use, the machine can be adjusted to take stock any length, 5¼-inches outside diameter, boring a hole of 2¼-inches maximum diameter.

In addition, attention is called to these other special features:

- 1—**Bed:**—The rigid, box construction bed of high grade cast iron provides a wear-resisting, non-galling surface the entire length of the ways. The smooth finish, true con-

*"We Saved **HALF** Our Storage Space,
and Cut Handling Time by **25%**"*



Part of the Installation.

Write us—today—For illustrated literature on the patented Stackbins. See how you can increase profits through storage efficiency. Stackbin Corp., 55 Troy St., Providence, R. I.

This statement was made by a large Western aircraft manufacturer,* who has made major economies since he installed Stackbins. Here's how he uses them:

Raw materials are carried to machines in Stackbins which are stacked within easy reach of the operator.

Finished parts are put in Stackbins as they come from the machines. Those Stackbins are taken to the plant stockroom where they are stored in rows as shown in the illustration.

Requisitions are filled at the stockroom from where wanted parts are carried to and used at the assembly line in Stackbins.

At the assembly line, Stackbins are piled in convenient places. The full width hopper front makes it easy for workmen to get the parts they want.

Thus, Stackbins save at every step in the manufacturing process. Parts are always visible and always accessible in full width, hopper-fronted Stackbins.



* Name on request

Individual Stackbin

STACKBINS

"STACKED AND STILL ACCESSIBLE"

tact surface ways are designed to prevent lift or twist of the carriage under maximum working conditions.

- 2—Feed Mechanism and Control:**—Regardless of resistance variation, the hydraulic feed mechanism provides uniform feeds from .0006-in., at 500 r.p.m., up to .380-in. at 20 r.p.m., of the spindle. Stops shut off the feed when the carriage reaches the required

limits. A safety stop comes into action, when overloaded, shearing the safety pin.

- 3—Headstock and Spindle:**—The headstock mechanism provides three mechanical changes of speed through sliding gears. By means of change gears in the headstock and a 20-point field rheostat, the hollow spindle has a range of spindle speeds from 20 to 515 r.p.m.

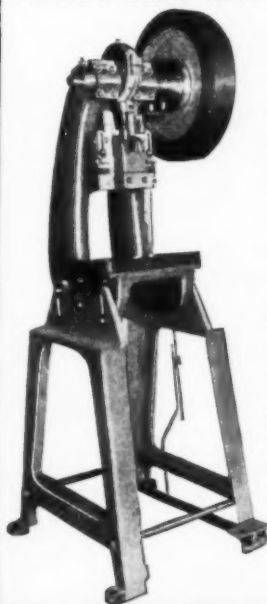
LONG STROKE—LOW PRICE

**GREATER CAPACITY—
NEW ECONOMIES
IN DEEP DRAW WORK**

**The only inclinable punch presses
AT THESE LOW PRICES—**

**No. 0 Rousselle - - - \$100
No. 1 Rousselle - - - \$150**

(less motor and stand; stand \$15 extra)



The new No. 1 Rousselle is designed especially for trimming deep die castings and all other types of deep draw work, which formerly required large, heavy presses because of the long stroke needed.

With automatic feed, 10,000 operations per hour are possible. NON-REPEAT clutch stops after each stroke, or can be made to operate continuously.

Check These Specifications:

Weight	490-lbs.
Crankshaft diameter at main bearings	4"
Diameter of crankshaft	1 1/4"
Flywheel weight	120-lbs.
Speed	300-r. p. m.
Diameter of flywheel	16 1/2-inches
Ram standard stroke	2-inches
Adjustment of ram	2-inches
Size of bottom of ram	3x3"
Ram to bed; stroke down adjustment up	6 1/2"
Size of hole in ram for punch	1 1/4"
Bed size	8x12"
Depth of throat to center of ram	4-inches
Size of opening between press frame at back	6-inches
Inclinable angle from right angle	30-degrees
Height	36-inches
Thickness of bolster plate	1-inch

Quickmail Coupon No. 70 will bring bulletin giving complete information.

DAVID J. ROSS & CO., BENTON HARBOR, MICHIGAN

- 4—**Coolant System:**—A self-contained coolant system, equipped with an electric motor driven coolant pump with a capacity of 15 gallons per minute and 500 pounds maximum pressure supplies the cutting tool with a steady, cool stream. The coolant returns to a baffled settling tank, from which it is forced through two Cuno filters by the pump.

Although on the market only a short time, orders have already been received for these new units.

Further description of this new lathe will be sent upon request. Address the R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. For your convenience use Quickmail Coupon No. 55.

"U-Draft" Pocket Drafting Machine

A new pocket "Drafting Machine" is offered by L. G. Wright, Inc., 5209-30 Euclid Ave., Cleveland, O. Known as the "U-Draft", this new instrument

combines T-Square, triangles, and drafting scales so that the instrument literally is a pocket size drafting machine. It is 7½-inches long overall and 1¼-inch wide.

It consists of a graduated scale and a protractor head on which lines are inscribed at 15 degree angles to the horizontal scale. Made of pyroxlin specially treated drawing instrument material, the scales are engine divided. A metal stiffener keeps the instrument flat.

In use, it is possible to make an accurate drawing 6 x 6 inches on any kind of paper. Angles 15 degrees apart may be drawn and all lines made accurately to length. It is supplied in four different graduations as follows: Full size 1/16-in., millimeters, full size 1/10-in., and also ⅛-in. and ¼-in. equals one foot.

The tool is intended for all types of mechanical drawings, cabinet drawings, installation diagrams, mathematical solutions, graphical calculations, floor plans, lettering, layouts, quick sketches, and dimensioning on larger drawings.

Just Specify — "PROGRESSIVE"

That's the prescription for End Mill Satisfaction—for End Mills that do the jobs faster, better and more economically.

There's a type, form and size of PROGRESSIVE End Mill for every job—designed and made by End Mill Specialists — guaranteed to satisfy YOU.

If you have any End Mill problems, our modern facilities and years of experience are at your disposal without obligation. Just send us your blueprints.

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**PROGRESSIVE
TOOL & CUTTER CO.
FERNDALÉ, MICHIGAN**





They must be good to keep customers like this satisfied. Perhaps you too can take advantage of the low first cost of Hanna Cylinders. To further determine this let us send you a copy of Cylinder Catalogue 226.

Use Quickmail Coupon No. 52 when you send for catalog.

PUSH--PULL--LIFT--WITH HANNA CYLINDERS

HANNA ENGINEERING WORKS

1763 Elston Avenue,

Chicago, Illinois

Nixon Hydraulic Broaching Machines and Presses

Three types of units, in capacities of two, three and five tons, are offered for light duty broaching and press work by the Nixon Gear & Machine Co., 200 Oxford St., Syracuse, N. Y.

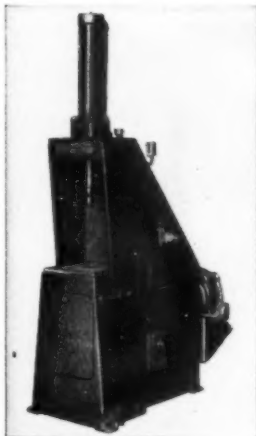
Designed for constant or variable ram speed, and featuring sturdy steel construction, these units offer a number of interesting features. They are intended primarily for medium and light surface or internal broaching, ball sizing, assembly work on typewriters, electrical parts, gun, sewing machine, instrument, valve, wrench, and similar parts that are now being milled.

Bases are of steel, electrically welded. Side plates are of one piece and not divided at the work plate. Hydraulic and coolant tanks are part of the base, and cleanout ports are provided.

The work plates are ground and easily removed for the mounting of work-holding fixtures. The bore in the work plate is central with the ram, for ease of alignment.

The Vicker Hydraulic pump is driven through a flexible coupling, at motor speed. A sight gage indicates the oil level. A pressure gage is mounted at eye level and provided with shock arrester and stop cock.

Coolant pump is driven by V-belt.





PYRO

Indispensable in any MODERN non-ferrous foundry. Reduce spoilage and secure UNIFORM SOUND CASTINGS. Patented clamping device stops the pointer at correct indication—a PYRO feature.

Write for our bulletin No. 110.

Pyrometer Instrument Co.
102 Lafayette St. New York

Adjustable stop collars are provided on the trip rod. These are easily set from front of machine.

Sensitive control is afforded by hand lever or foot pedal—arranged to stop at bottom, or make complete cycle.

For full details, address the makers, and please mention The BLUE BOOK.

HARD USAGE Doesn't Phase The HARTFORD MILLING VISE



We also Build Machinery on a Contract Basis, Design and Develop Special Automatic Machinery—Gears and Cams Cut to Order.

Because it was designed to "take it"—and it does! It will stand up, day after day, under the heaviest, toughest strain of production milling work. Made of the best materials, with all parts interchangeable, it will outlast four or five ordinary vises. Rapid and accurate in operation—the top eccentric handle gives tremendous binding force, while the lower cam-faceted handle gives instantaneous quick-opening and return. A trial in your shop will convince you better than anything we might say.

Write for Folder and Complete Details

Jaw width.....	5'	Maximum opening	3½"
Jaw depth.....	1¼"	Weight.....	40 lbs.

Also made in the swivel-jaw type with hard or soft jaws, maximum opening 2¼".

HARTFORD SPECIAL MCHY. CO.
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CHECK THESE POINTS

on the **WELLS BAND SAW**

NOW with
**3 SPEED
CONTROL**

**EFFICIENT
ECONOMICAL
VERSATILE
ACCURATE
FAST**

Use Quickmail Coupon No. 31.



Built in Two Sizes:

No. 5 Size
5" diameter
round or
5"x10"
flat.

No. 8 Size
8" diameter
round or
8"x16"
flat.

Run down the list of advantages a Wells Band Saw has. Then consider what these features would

mean to you. Those jobs of cutting bars, angles, tubes and other miscellaneous work can be handled a lot quicker and more accurately with a Wells Saw. We will gladly send you a folder without obligation.

● Saw it the **WELLS WAY** ●

WELLS MFG. CORP. Three Rivers, Michigan

Bantam "Supersockets" Announced by Williams

J. H. Williams & Co., 75 Spring St., New York City, announce three new lines of Bantam Sockets to their "Supersocket" wrench line.

These include extra deep 12-point sockets 2 to 2½-inches long, in six sizes, with openings $\frac{1}{8}$ to $\frac{3}{4}$ -inches; extra deep 8-point sockets 1½-inches long, in four sizes, with openings $\frac{1}{8}$ to $\frac{3}{4}$ -inches, and universal 12-point sockets in four sizes with openings $\frac{1}{8}$ to

$\frac{3}{4}$ -inches. All are designed for use with ratchets and other handles fitted with $\frac{3}{8}$ -inch square drive, walls are thin for operation in close quarters.



The universal sockets are very short and compact in design. They operate through a range of 180° and are fitted with spring tension to maintain desired angle when applying socket to the job.

Williams' "Supersockets" are said to be made from a superior grade of high tensile steel (chrome-alloy) and heat-treated in electric furnaces for maximum toughness and strength.

Complete information may be obtained from the manufacturer. In writing please mention The BLUE BOOK.



STRIPPITS

For die stripping—
dependable—

economical

Also, WALES individual, sub-press type hole-punching and notching dies.

Write for Bulletin A

THE STRIPPIT CORPORATION
1559 Niagara St., Buffalo, N. Y.

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Save time and labor cost in assembly. You can depend on quick delivery from the modern Triplex plant—whether a package or a carload. Complete line of sizes, standard and special heads.

Write for samples and
prices today.

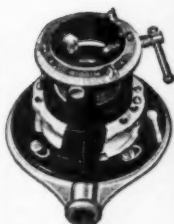
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CAP AND SET SCREWS, BOLTS AND NUTS

Millions Sold—Used in Every Industry



New **RIDGID** No. 65RC
with cam type work-
holder.



New **RIDGID** No. 65RP
with plate type work-
holder.

Rugged new **RIDGID** No. 65R All-Steel-Malleable Alloy Die Stock, with drop-forged hardened tool-steel cam plate. Threads 4 sizes of pipe with 1 set of chaser dies. Your choice of 2 new mistake-proof workholders.

New strength and durability throughout. Quick automatic setting to size saves time and chaser expense. Two speedy workholders, both practically automatic — no bushings. A modern super-efficient tool you'll take workmanlike pride in. Buy it—for quicker easier better threading at lower cost. Ask your Supply House.

THE RIDGE TOOL CO.,

Elyria, Ohio

RIDGID PIPE TOOLS



NEW INTEGRAL DRIVE PRECISION BENCH LATHE

(Patented)

First tool of its class with built-in motor and speed-changing mechanism, entirely eliminating mill-wrighting. Nothing under bench—Nothing overhead. Drive integral with the lathe itself. Marvelous compactness, using little more space than other lathes. Any powerful vibrationless speed at a turn of the hand wheel in front.

Belted and wired, ready to run. Priced at only slightly more than other precision lathes with separate, complicated drives. Two splendid sizes. (Colored Bulletin J).

Also Stark Standard Precision Lathes, 6 sizes, $\frac{1}{4}$ " to $1\frac{1}{4}$ " capacity and up to 12" swing; with complete equipment. Stark Spiral Bench Millers, the most accurate of their type.

Stark Tool Co. Est. 1862 Waltham, Mass.
Originators of the American Bench Lathe

Acheson Announces Product Improvement

"Dag" colloidal graphite is to be available in an even higher quality than heretofore, according to an announcement by Acheson Colloids Corp., Port Huron, Mich.

Four years of experimental investigation has developed a new process permitting the commercial production of graphite products having considerably smaller particle size and correspond-

ingly improved suspension.

Instead of a single grade as before, Acheson plans to market several, distinguished primarily by a range of particle size. The first, or top grade will contain particles ranging between one micron and the submicroscopic (1 micron = 0.00003937 inches). The particle size in this product is so minute that it may be said to border on true solution, (such as sugar in coffee, salt in sea water) although retaining the valuable inherent qualities of solid graphite.

A further and equally important advantage is the availability of "dag" colloidal graphite in a considerably wider range of vehicles. In addition to water, petroleum, castor oil, glycerine and varnish, excellent dispersions in kerosene, carbon tetrachloride and similar light-viscosity fluids may be had.

The combined improvement in particle size and suspension now opens new fields of industrial use for "dag" colloidal products. Having finer particles, it is claimed that the new colloidal graphite more readily impregnates porous bodies and imparts to them desirable qualities of lubricity, electrical conductivity, and coloring. The lubrication of remote and closely fitting parts is also facilitated. Finally, with a greater number of carriers possible, new and now unforeseen applications will undoubtedly develop. The dispersion of colloidal graphite in highly volatile carbon tetrachloride, for example, is already reported valuable for use in forming dry films which have interesting electrical and adhesion properties.



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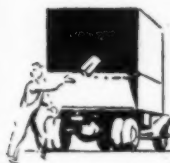
NEU-T-ROL saves loss of time . . . prevents damaging, scoring and marring of work and magnetic chuck . . . prevents bruised knuckles . . . by releasing work completely and demagnetizing it. Available for all sizes of magnetic chucks . . . easily installed as it replaces existing switch and connects to same D. C. wires.

Write TODAY for full information.

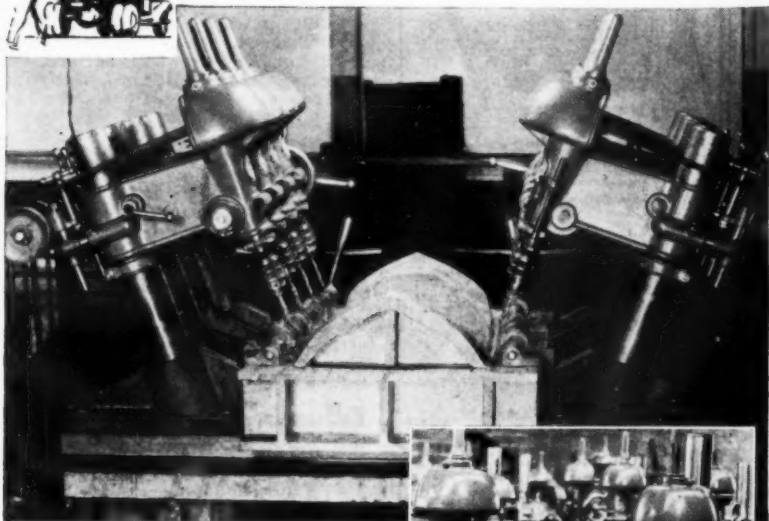
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4820 Deming Place,

Chicago, Illinois

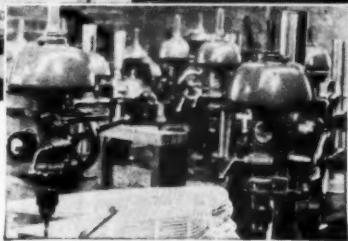


WHY SEND A 5 TON TRUCK FOR A 5 LB. PACKAGE?



DOEHLER PLANT CUTS COSTS WITH WALKER-TURNER TOOLS

Small engineered machines save hundreds of dollars—"Best adjunct to production short cuts I know of", says the plant engineer.



Walker-Turner Precision-Built Tools offer an opportunity to expand with minimum of capital outlay. The low initial cost can often be charged off on the first sizeable contract.

The Doepler Die Casting Co., Toledo, one of the industry's pioneers, uses over two hundred Walker-Turner Series 900 Drill Presses and Drill Press Heads on steady, rugged production work . . . and over 100 other Walker-Turner machines elsewhere in the plant. Doepler's output, much of it for the automobile industry, must be done economically; must meet precision standards; must be delivered on schedule. In this plant as in many who have found the secret of fitting the light ma-

chine to the light jobs, Walker-Turner Tools are "made to order". The Walker-Turner Catalog may give you the answer to far lower equipment and production costs—send for it today. See these tools at your nearest Walker-Turner distributor's.

Walker-Turner Co., Inc.
17118 Berckman St.,
Plainfield, N. J.

Quickmail Coupon No. 72 will bring you full information.

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USE WALKER-TURNER LIGHT POWER TOOLS FOR LIGHT PRODUCTION

DRILL PRESSES, FLEXIBLE SHAFTS, BENCH GRINDERS, BENCH SAWS, BAND SAWS, JIG SAWS, JOINTERS, SHAPERS, LATHES, SURFACERS.



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Machined Steel **DIE SETS** Semi-Steel

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Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 185,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

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"GUSHER—EQUIPPED"

means no more coolant worries. Coolant supply is as steady and sure as water flow from your kitchen spigot.

GUSHER pumps have no packing—no metal-to-metal contacts. Priming is instantaneous and automatic.

Send NOW for full information

The RUTHMAN Machinery Co.

538 E. FRONT ST., CINCINNATI, O.



Hobart Arc Welding Manual

Hobart Brothers offer a new 100-page pocket size Arc Welding Manual. Following a serial lesson form, instructions are presented in a popular, easily comprehended style, and numerous illustrations show clearly the methods to be pursued. The lessons start with the rudiments of the art and carry the reader right on through a great many typical operations. Explicit directions are given for making a great many different types and forms of welds. The reasons why are explained as well as the difficulties that might be encountered and the things to watch—and to avoid.

The book is printed on enamel stock, type is large and easily read, and the tough cover will stand rough handling.

Copies may be obtained at 50 cents each, by addressing Hobart Brothers, Hobart Square, Troy, Ohio. In writing, please refer to **THE BLUE BOOK**.

Froussard Cylinder Boring Bars

Boring cylinders in place is desirable and more profitable. Hence the machine shop with precision equipment for doing such work enjoys a decided advantage in obtaining this business, along with other work that often accompanies boring jobs.

The Froussard bar is of special steel, ground to precision limits. It is driven by a heavy duty worm gear reduction. The drive housing is fitted with four, long, double sleeve bearings. The outer sleeves are tight in the housing, while the inner sleeves rotate with the bar.

ARMGLO CO.

Manufacturers of

Manual and Automatic Resistance WELDING PRODUCTION EQUIPMENT
with Magnetic Timing Control
also

DIE FILING & BELT SURFACING MACHINES

Write for complete details

ARMGLO CO., 3520 W. Pierce Street,
MILWAUKEE, WIS.

With this arrangement, the inner sleeves revolve in the outer sleeves to prevent wear on the bar. The worm is of tool steel, Timken mounted. Worm shaft extends on both sides of housing so it may be driven from either side. A tapered adapter shank is provided so either an electric or an air drill may be used, or a pulley and belt drive may be arranged, using any

exact central position by moving the machine on these adjustable arms and then locking it in place.

Centering brackets are fitted with long sleeve bearings that rotate with the bar, eliminating wear on the bar itself. Sleeves are made with a key that fits into the feed screw slot in bar. This key prevents sleeve from turning on the bar, but allows bracket

to be moved lengthwise on the bar to any required position. The same arrangement is used on drive housing sleeves.

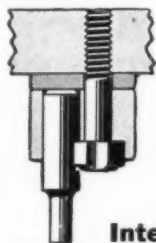


kind of motor or engine for motive power. Worm ring gear is of special gear bronze and the drive is fully enclosed, running in oil.

Set-up time is facilitated by the centering brackets, made with three adjustable arms. After bar has been placed in cylinder, it is set into the

An expansion centering device is furnished, made with a series of tapers to fit stuffing boxes of various sizes. When it is not necessary to remove one of the cylinder heads, this device fits tightly into the stuffing box and holds end of bar in a positive central position.

Four standard cutter heads are pro-



HOVIS Hardened Retainers

**Strongest
Simplest
Interchangeable
Punch Retainers Made.**

EASILY Locked in
—Removed

NO Gadgets
Springs

Group plates of any size or number of punches, to your requirements.

Catalog on request.

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3125 E. Larned St., Detroit, Mich.



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of Comfort
IN DOWNTOWN
DETROIT

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OUTSIDE
ROOMS

Hotel
BARLUM

CADILLAC SQUARE
AND BATES STREET

ALL WITH
BATH
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\$2.

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ARBOR PRESSES • SHAPERS**

Cut SHEET METAL

to Any Size or Shape

Straight — Circular — Irregular

The BEVERLY SHEAR cuts flat, with clean, sheared edges, free from knurl —without distortion and with minimum effort.

Two sizes—No. 1 weighs 16½ lbs. and cuts up to 14 gauge. No. 2 weighs 32 lbs. and cuts up to 10 gauge. Can be carried in tool box.

*Write for
circulars and
prices.*

**THE BEVERLY
SHEAR CO.,**

3007 W. 110th Place,
Chicago, Ill.



vided with each bar, of sizes specified when ordering. These are fed along the bar through the cylinder, by a steel feed screw, set in a slot on the side of the bar.

Speed of the cutter head is governed by the feed gears on head of bar, permitting coarse, medium or fine cuts by changing one of the feed gears. By using the proper feed ratio, cylinders can be rifled, and also, various pitch internal threads can be accurately machined.

Cutter heads are made with a split bronze feed nut, with an adjusting hand screw on top half. This arrangement permits hand nut to be screwed apart, the cutter head moved along the bar to the correct position and feed nut then locked back in place around the feed screw.

Kindly address the Multiple Boring Machine Co., 2221 Lucas St., St. Louis, Mo., for additional information. It helps to mention The BLUE BOOK.

GRANT

RIVETERS

include both Noiseless Spinning and Vibrating Hammer types of machines —also Vertical and Horizontal Multiple Spindle Spinning Machines.

*Send
unriveted
samples
with
request
for
recommen-
dation
and
quotation.*



**THE GRANT MFG.
& MACHINE CO.**

C. E. Station
BRIDGEPORT, CONN.

Interior Steel Equipment

A wide range of modern steel equipment for offices, shops, factories, stock and tool rooms is offered by The Interior Steel Equipment Co., 2352 East 69th St., Cleveland, Ohio.

The line includes many types of interior steel shelving, built on the unit principle. This permits adoption of the units needed at the present, and future extensions as required.

There are many types of cabinets,

drawers, boxes and bins—special sloping shelf compartments for storage of drills, small tools, jigs, dies, etc. Also milling cutter racks, portable bins, machine tenders, compartment boxes, etc.

Numerous types of lockers are offered, in single and double tier styles, combination, box and double door designs.

Items for offices include steel desks of the latest designs. These are of the flat top, single and double pedestal, typewriter and foremen's types.

Steel record cabinets embrace letter files, card index cabinets, drawing and blue print files, etc.

Storage cabinets of various sizes, with adjustable shelves, may also be had with wardrobe compartments.

Bulletins illustrating and describing all of these different fixtures are available and may be had on application. In writing, please mention **The BLUE BOOK**.

Flexible Shafting

The Charles L. Jarvis Co., Middletown, Conn., offer catalog MST, covering their complete line of flexible shaft equipment. This embraces everything from a 5-inch long flexible coupling to a 75-foot sewer cleaning job or driving a 9-inch sanding disc for polishing airplane propellers.

Jarvis units are available in $\frac{1}{8}$ to 3 h. p. capacities.

• Your lubrication problems, whether large or small, will find the correct answer in the Gits Line. If your requirements are of special nature, send us your specifications.

GITS BROS. MFG. CO.

27 years of oil cup experience

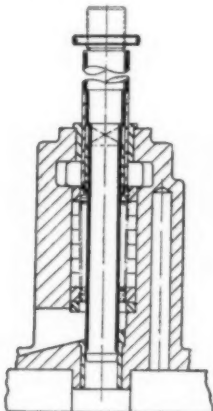
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Broaching Improves Synchronizer on 1939 Car Models

To improve synchronizer action in 1939 automobile transmissions and eliminate clashing during shifting, in connection with the adoption of shift controls mounted on the steering column, a prominent manufacturer has developed a new production line-up for more accurate manufacturing of syn-

chronizer rings. Key to the set-up is the broaching operation for cutting the external synchronizer teeth. A standard vertical broaching machine was used with a special fixture developed by Colonial Broach Co. This fixture



is of the push type. It broaches 30 external teeth on the synchronizer ring simultaneously, alignment being held to close tolerances with the bore of the ring.

It will be noted that the part—shown cross hatched in the drawing—is pushed downward through the fixture, the broaches being stationary.

With the ram at the top, the part is placed in the ground diameter at the

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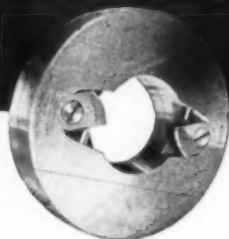
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top of the fixture. The ram travels downward, with the guide bar slipping through the bore of the part and into a guide bushing at the lower end of the fixture. This, together with the guide bushing at the top, maintains accurate alignment during broaching.

Only after the pilot bar has passed into the lower guide, does the flange on the bar pick up the part and push it down through the broaches. The latter are made in the form of annular segments, these segments being solid rings. Accidental breakage of broach teeth requires the removing and replacing of only one segment. At the bottom of the stroke, the ram reverses, and the part drops out, down the slide shown.

Reeves Develops New Control

Development of a mechanical automatic control for the Reeves Motodrive, is said to increase the utility of this unit.

The Motodrive itself — a modern variable speed control unit combining speed control mechanism, motor and gear reducer in one assembly — is already known. The new control provides entirely automatic speed regulation of the Motodrive to make possible synchronization of different machines and separate sections of a single machine; maintenance of constant tension and uniform peripheral winding speeds; and maintenance of uniform pressure, weight, liquid level, temperature and other variable elements.

On the motor (constant speed) shaft is a cover plate including a lever bracket and extended lever which may be attached by cable or chain or direct to a compensating or floating roll (where properly balanced by weights), pressure regulator, moving carriage or part of machine, etc., from which indication of required speeds can be taken. Movement of the lever is transmitted to the speed changing mechanism of the Motodrive to change its speed in accordance with the indicating movement.

Travel of the lever in either direction is limited by stop screws. The

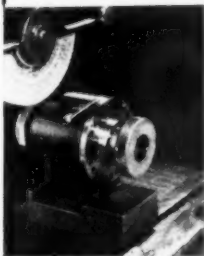
lever may be of any length, as required by the installation, and may be assembled in any one of four different positions. The control is available for



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For further details, please address Reeves Pulley Co., Columbus, Ind., and mention The BLUE BOOK.

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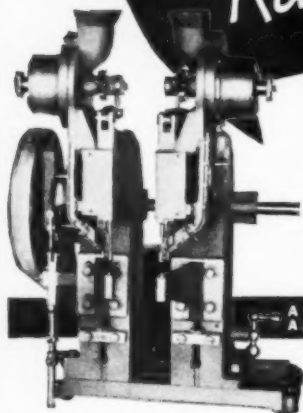
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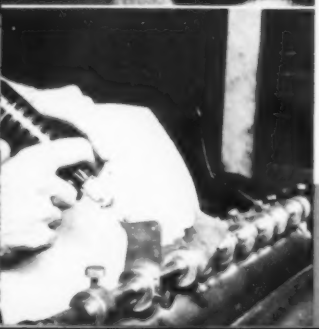
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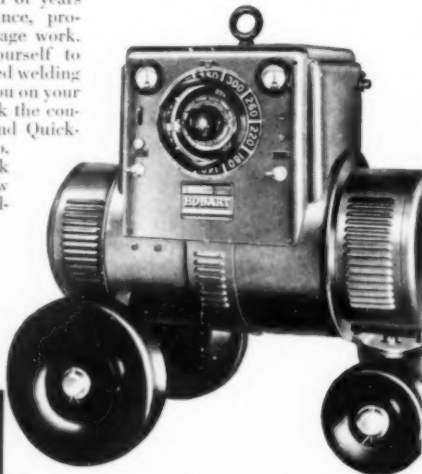
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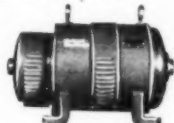
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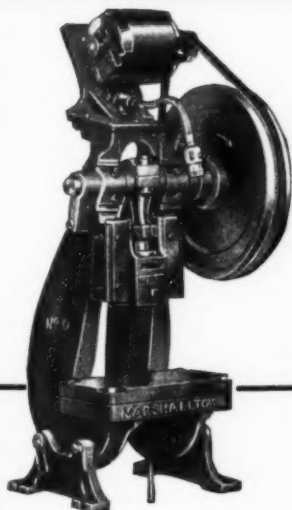
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No. 0 BENCH
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Colonial Announces New Vertical Broaching Machines

A completely new line of utility broaching presses comprising six tonnage classifications is announced by Colonial Broach Co., Detroit, Mich. Designed as Open Side Utility broaching presses, these units are especially useful for broaching and assembly work on long and bulky pieces.

The column has a long face-plate with several transversely milled T-slots and rows of tapped holes, permitting adjustment of table height in six-inch steps.

A maximum of "daylight" is available. Standard clearance between ram and base is 60 inches (6 to 15 ton models), but this can be further increased by placing riser blocks in column. To facilitate changing height, all main valves and controls are located in the head, while the column is of

SCHMIDT "Hi-Duty" Pneumatic MARKING MACHINE



MODEL 25
(Side view shows
air cylinder)

ADVANCED BUSINESS METHODS demand improved records of metal fabrications. This machine makes marking operations quick and simple. Part numbers—order numbers—manufacturer's name and other important data marked on your products will mean permanent records, to last the life of the part, and REPEAT ORDERS, a vital part of any business.

The Schmidt Model 25, illustrated at left, is a light, general purpose hand marking machine, with a supplementary air cylinder to take the place of the foot pedal in raising the work to the lettering tool. Air from the shop line is used, and the four-way foot valve assures fast operation. This machine uses solid flat or round dies as well as the adjustable type, in a flat or knurl type holder. The use of the air cylinder, by reducing operator fatigue, greatly increases production on continuous marking operations.

SPECIFICATIONS

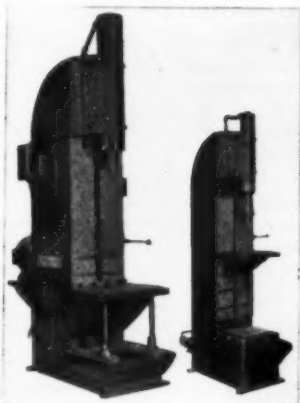
Will mark flats or irregular surfaces up to 4" thick.
Will mark rounds up to 10" diameter, or bars up to 4" diameter.
Carriage or Die Stroke.....2½"
Throat—Center of die to front of uprights.....3"
Roller Bearing Die Slide.
Table Rise—Low to High Position.....6"
Table Rise by Air Cylinder.....½" - 1"
Table Pressure 2400 lb. at 75 lb. line pressure.
Table Dimensions 5½"x9½" with 2"x4" slot.
Operates on line pressure of 30 lb. to 100 lb.

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two piece construction (except 2 and 4 ton models).



A separate cylinder casting on all models permits rapid change-over of machines to different tonnages and

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Colonial's well-known practice of fabricated steel welded unit construction has been followed. For maximum rigidity and stability, the cylinder casting is bolted to the column on a 22 by 24 inch face-plate.

Six standard capacities are available, ranging from two to 15 tons, and strokes of 18 and 36 inches—although special tonnages and capacities may be had. Hydraulic operating mechanism

Sanding and Polishing Machines

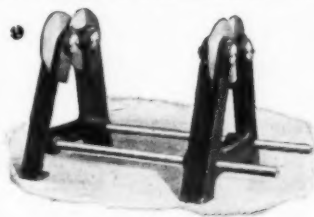


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Every shop handling rotating parts needs this simple, sturdy, dependable device for balancing, straightening and truing operations. Saves time and trouble and assures better work.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a prompt, sure indication of whether or not the work is in perfect balance.

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Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
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60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

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Glass-hard jaws.

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A precision tool at a reasonable price.

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is designed for quick return, while all models are available also with either constant or variable working stroke speed.

Strokes are adjustable by means of stops on the column. Manual operation is standard, with foot pedal control optional.

Hydraulic pumps are direct driven by electric motors with a standard horizontal mounting on column at rear. Direct drive motors may be mounted vertically within the column, if desired, for even greater compactness and streamlining. Absence of external valves enhances appearance.

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The two and four ton open side presses follow the general construction of the larger models. Columns are of one piece construction, but the separate cylinder casting design is maintained. These machines also offer such features

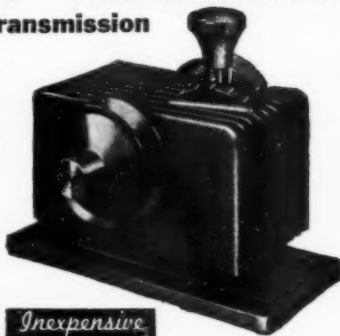
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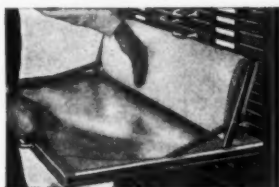
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as variable work height; direct drive motors, with external horizontal or internal vertical mounting; separate coolant motor; manual control; adjustable strokes; welded steel construction, etc.

The larger machine shown is the 10 ton type with 36 inch stroke, while the smaller unit is rated at 2 tons with a stroke of 18 inches.

For further details, please address the makers, and it helps to mention The BLUE BOOK.

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Telescopic Stacker with Retractable Revolving Base

The Lewis-Shepard Sales Corp., 245 Walnut St., Watertown, Mass., offer a new type of Telescopic Stacker, equipped with a retractable revolving base, known as PBRT 1923.

The base construction of this new portable elevator includes retractable travel wheels and a circular plate which supports four rotating wheels mounted in stationary position in the base. The elevator may be moved along the floor with its regular travel wheels to any given position. These wheels then are retracted to allow weight of stacker to be transferred to the plate, and the complete unit can be rotated on the plate for a desired change in direction. Such construction allows stacker to be turned at right angles within its own length, affording maximum maneuverability.

The stacker will lift a load of 1500



MARSCHKE

The SELECTIVE SPEED BUFFER with independent spindle drive, as shown in this illustration, is made in three sizes for 5, 7½ and 10 H. P. motors. It is only one of the several types and sizes of MARSCHKE BUFFERS.

The MARSCHKE LINE includes a wide variety of BUFFERS, FLOOR STAND AND SWING FRAME GRINDERS for the different conditions and different requirements of every plant in any industry.

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Send for catalog showing machines with 10" to 30" wheels and 1 to 25 H. P. motors

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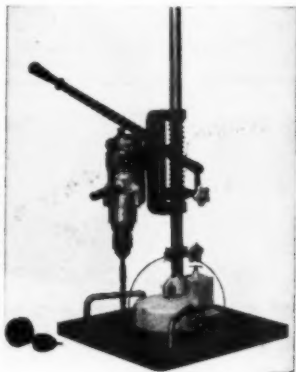
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ACME Industrial Co.
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Stearns Magnetic Mfg. Co., Milwaukee, Wis., offer a powerful yet small and light magnet for attachment to the average type of "old man stand". They do not sell the entire magnetic drill stand, but furnish only the magnet. To provide this they must know the diameter of the upright shaft which supports the drill.

It is claimed that the use of this device will enable the operator to increase his work output with a minimum of fatigue. The drill can be operated horizontally, vertically, upside down or at almost any angle. It affords full visibility and can be used on all parts, center or edges of the material.



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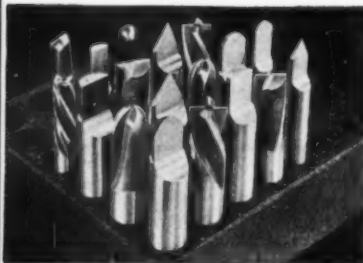
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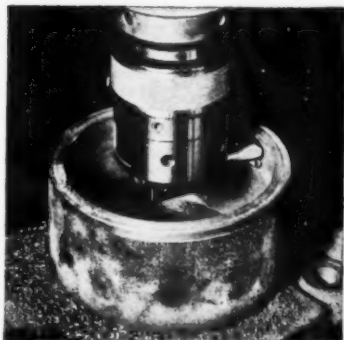
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Pratt & Whitney have adopted the Precision Universal Tool Head and their Jig Borers are now specially arranged to fully utilize the versatility and speed of this indispensable tool.

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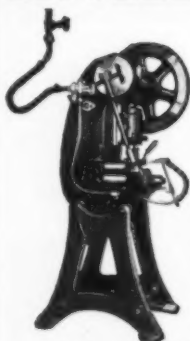
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For economy and high production in grinding, lapping, polishing and finishing small parts. Readily adapted with collets or step chucks to handle work at low unit cost. Hand or foot operated, with patented automatic brake. Two-speed dust-proof motor will operate continuously without overheating.

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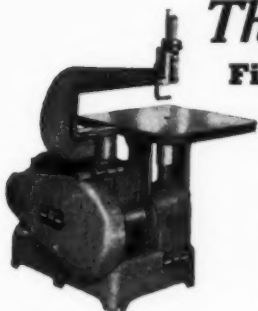
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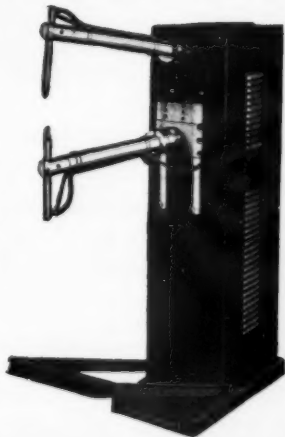
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640 Cross St., Benton Harbor, Mich.



cover which can be completely removed for installation and wiring; a tilting panel frame which allows quick, easy access to the rear of the panel at all times; a wiring trough in the rear compartment which facilitates wiring and which effectively shields rubber covered wire if used; heavy duty contactors used throughout; and heavy duty non-breakable or grid type resistors.

These controllers conform entirely with the new NEMA standards for machine tool and general purpose serv-

ice, and include non-reverse and reversing types, with and without dynamic braking, for both constant speed and adjustable speed motors. They are available for use with either pushbutton or drum type master switch and in all standard NEMA ratings up to 75 h.p., 115 volts; and 150 h.p., 230 and 550 volts.

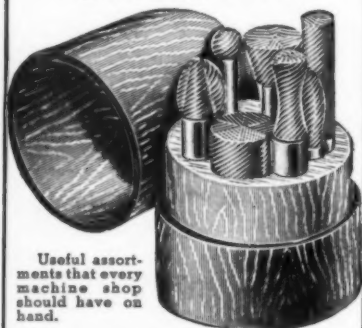
Binks Announces Pre-Cooler For Main Air Lines

Binks Mfg. Co., 3114-40 Carroll Ave., Chicago, announces a new pre-cooler for the better extraction of moisture from plant compressed air lines. Used in conjunction with the Binks No. 540 Main Line Oil and Water Extractor, the new pre-cooler assures a maximum of efficiency in cleaning compressed air lines where excessive moisture is the greatest problem.

The outside shell dimensions are 15 inches in diameter and 36 inches long. The inside of the shell is partially filled with air tubes so that the heated air goes through them and is cooled by the circulation of water around the tubes at a minimum rate of two gallons a minute. The cooling of air causes it to deposit moisture which is collected by the No. 540 main line oil and water trap which directly follows the pre-cooler. Surplus cooling water is piped to a sewer.

The unit will take care of 200 cubic feet of air per minute. Inlets and outlets in both pre-cooler and extractor are for 2-inch pipe. The No. 540 Extractor is 45½-inches high, 8¾-inches in diameter, and is equipped with ¾-inch drain cock.

GROBET Hand Cut ROTARY FILES ARE THE BEST



Useful assortments that every machine shop should have on hand.

Ask for catalog WR

Grobet File Corp. of America
3 PARK PL. NEW YORK



GEARS IN STOCK—IMMEDIATE DELIVERY

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on gears of any kind. Send us your blue prints and inquiries.

Write for Catalog No. 70

CHICAGO GEAR WORKS,

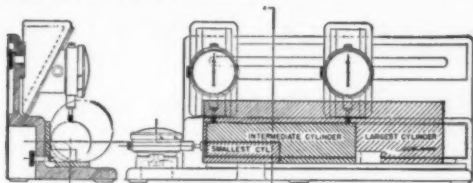
749 W. JACKSON BLVD.,
CHICAGO, ILLINOIS

Dayton Rogers Small Lot Metal Stamping Service

A helpful service is offered by Dayton Rogers Mfg. Co., Minneapolis, Minn., in the development of methods for producing metal stampings in small lots with minimum tool cost for blanking, piercing, forming and drawing dies.

*You can
save a lot
of costly
"misfits"*

if you use —
**FEDERAL DIAL
INDICATOR GAGES**



Many types of indicator gages are saving assembly costs. The above checks pins at any two points for diameter and length. This is only one of a great many. If you have duplication troubles, write to—

FEDERAL PRODUCTS CORP., 1144 EDDY ST., PROVIDENCE, R. I.

FEDERAL

PRECISION MEASURING INSTRUMENTS

Chicago • Cleveland • Detroit • Hartford • Muncie
New York • Philadelphia • Pittsburgh • Rochester

It is explained that the Dayton Rogers Method does not involve the usual expenditure of time and money for dies.

The production of stamped blanks without the use of standard blanking dies is not a new idea. For a long while some manufacturers have been using some kind of a temporary blanking die. The Rogers organization though, have developed a temporary

blanking and piercing method. Using a new and improved compound piercing and blanking die it is said that exact duplication of all blanks, pierced holes and slots is assured.

Stampings of any shape, according to requirements can be blanked, pierced and formed from any material.

Maximum blank size is 20 x 20-inches. Maximum blank thickness is 1/4-in. Maximum blanking pressure is 250 tons. Present production is 600 to 700 dies per month. Average die life is stated to be 8000 to 10,000 accurate blanks.

All required working tolerances will be followed rigidly, assuring accuracy and uniform duplication throughout each lot.

A complete stock of various metal stamping materials for immediate use is available.

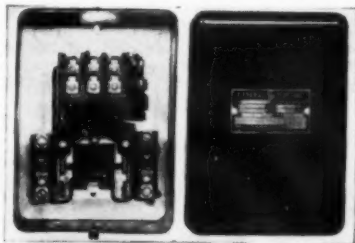
Send Quickmail Coupon No. 46 for catalog.

G-E Announces Smaller A-C Magnetic Switch

A new A-C magnetic switch (CR7006-D51) has been developed by General Electric Co., Schenectady, N. Y., for full-voltage starting of single-, two-, and three-phase motors. While it is small and compact, it has been designed in full accordance with established standards of electrical clearances, mechanical strength, and ratings. Its principal features, in addition to its small physical dimensions,

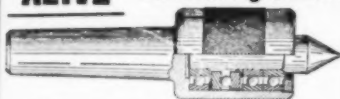
are its conservative electrical design, long mechanical life, and low maintenance costs over a long period of time.

Basically, the switch consists of a line contactor, with interlock to provide



undervoltage protection, and two isothermic temperature overload relays to protect the motor against overheating. These elements are mounted in a general-purpose sheet-steel enclosing case. The open-type switch is furnished with a rigid mounting plate to permit easy mounting on either an insulating or a conducting panel.

"ALIVE" Ball Bearing Centers



"They turn with the work"

Write TODAY — and let us tell you more about them.

MODERN MACHINE CORP.

323 Berry St.,

Brooklyn, N. Y.



Janette



Illustrating types MSG1 and MSG2, single reduction, multiple spur gear motorized speed reducers.

Motorized Speed Reducers

10 DIFFERENT STYLES

from which to select the exact type of speed reducer to meet your individual requirements.

1/30 to 7-1/2 H. P.

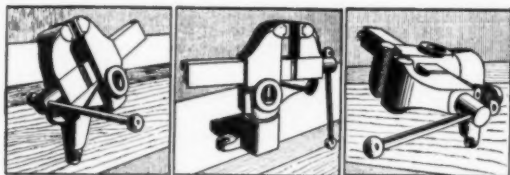
The diversity of the Janette custom built line of motorized speed reducers, enables us to supply a machine for almost any purpose.

Ask For Bulletin 22-25D

ROTARY CONVERTERS — MOTOR GENERATORS — BLOWER WHEELS

Janette Manufacturing Company

556-558 West Monroe Street Chicago, Ill. U. S. A.



"All-Angle" Toolmakers Vise

Unusual portability is one of the most attractive features of this new vise. As a rule, vises are permanently bolted to benches. The "All-Angle" may be used anywhere—on a service truck, at any location required in shop, tool or stockroom, on a drill press or any place where the inexpensive mounting bases are provided. The vise is simply slipped off one base and onto another. There are no bolts, levers or screws to manipulate. It may also be used anywhere as a powerful clamp.

The swiveling feature is also useful. This permits instant swiveling to any desired angle in vertical or horizontal positions. The vise jaw screw not only clamps the jaws on the work but simultaneously locks the vise rigidly in any desired position.

It is said to be equally efficient, stationary or swivel. The stationary lock operates by a simple turn of the knurled wheel nut after the vise has been locked in position by the jaw screw.

Three types of jaw plates are avail-

able, all interchangeable — hardened tool steel with either smooth or machine checked faces or smooth brass.

Address Fray-Mershon, Inc., 515 W. Windsor Road, Glendale, Cal., for bulletins giving complete information, and please

mention The BLUE BOOK.

LET US QUOTE...



Our new modern plant is fully equipped with special machinery for

**COMMERCIAL JIG BORING,
DESIGNING AND BUILDING
of
DIES, JIGS AND FIXTURES
LARGE OR SMALL**

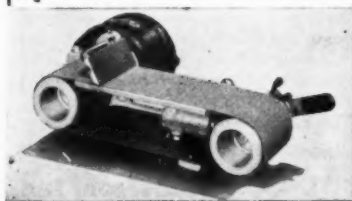
We can handle your Jig Boring jobs at reasonable prices on our new 18"x36" Pratt & Whitney Jig Borer. Quick service.

Have been delivering satisfaction since 1929—let us serve you.

QUALITY TOOL & DIE CO.

Ray W. Rice, Manager,
401 N. Noble St., Indianapolis, Ind.

AN INEXPENSIVE ABRASIVE BAND GRINDER



"Built Like A Machine Tool"

The Humel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on belt. Ball bearing throughout, equipped with Alemite lubrication, complete with grease gun.

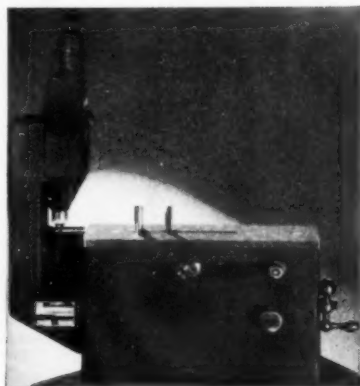
Write for illustrated folder on this and other styles and sizes.

WALLS SALES CORP.
96 Warren St., New York, N. Y.

Sheffield Universal Internal Measuring Machine

The new Sheffield universal internal measuring machine is claimed to provide an answer to what has previously been an unsolved problem in the line-up of present day internal inspection equipment. Without resorting to attachments or adapters, the new Model N-2 is said to afford infinite range in the measurement of any size internal diameter within the capacity of the

machine. The standard model measures all internal dimensions from $\frac{5}{8}$ " to 6" against a master or precision block



Centerless Grinding (CONTRACT WORK)

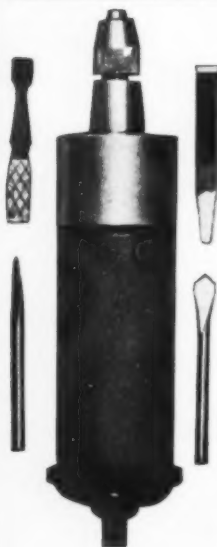
Precision, Accuracy, Promptness

Let us quote on your specifications.

THE HEIM COMPANY
Fairfield, Connecticut

setting. Other models can be obtained for other size ranges.

Two fingers, each carrying a measur-



New!

Different!

HOOVER

Multi-Purpose Tool

It Files, Chips, Saws, Routs and Cuts...

This revolutionary new tool is indispensable for Die Makers, Engravers, Patternmakers and Artists in Wood, Stone, Bronze, Aluminum and other metals. It provides a powerful reciprocating motion (back-and-forth—NOT ROTARY) with a $\frac{1}{2}$ " tool movement. Capacity in chipping is $\frac{1}{8}$ "—in filing or sawing, $\frac{1}{4}$ ". Can be used with a wide variety of tools, four typical examples of which are illustrated. The HOOVER is small, light, perfectly-balanced, easy to hold and use and it handles all kinds of tough routing, filing, chipping, sawing and chiseling jobs—quickly and with little effort. Workmanship and material are fully guaranteed.

Price—19.50 each net.

Write for full details. Dealers' inquiries solicited.

HOOVER TOOL CO., Anderson, Ind.

ing point, and both adjacent to a vertically traveling work rest plate, are all combined in design so as to permit full exploration and determination of the dimensions of a hole at any point on its internal surface within the 1½-inch depth-range of the gage. Consequently, taper as well as diameter are quickly disclosed throughout the depth of the hole being checked.

Each of the gaging elements is mounted on vertical reeds, avoiding loss of accuracy through friction. It is explained that the so-called fixed gaging point floats on vertical reeds with a fixed relation to the reed pivot which transfers the motion of the adjustable gaging point to the visual gage. Therefore, only a variation in the distance between the two gaging elements will vary the visual gage reading. In addition there is always gaging pressure only, on both sides of the hole being checked, irrespective of the operator's touch on the part being measured.

The new Sheffield product should save time and insure accuracy in checking master and working ring gages to set snap gages, length gages, and other inspection tools of this type.

The new product is said to be fully protected by patents issued, as well as additional patents pending.

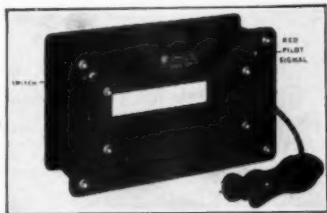
For additional information, please address Sheffield Gage Corp., Dayton, Ohio, mentioning The BLUE BOOK.

Cushioned Air Cylinders in "No-Cushion" Price Class

A complete line of air cylinders with non-adjustable cushion-heads is now available in the same price range as non-cushioned air cylinders. This new development was recently completed by Galland-Henning, makers of Nopak 2, 3, and 4-way operating valves for air, oil and water.

The purpose behind this new type of cushioned air cylinders was to elim-

AMC DEMAGNETIZER A TOOL ROOM NECESSITY



Every tool room needs this simple, portable, sturdy demagnetizer. Small parts passed through the powerful AMC field are instantly demagnetized. Large, flat surfaces can be demagnetized by sliding the device over the surface.

Write for full information.

ALOFS MFG. CO., Grand Rapids Mich.

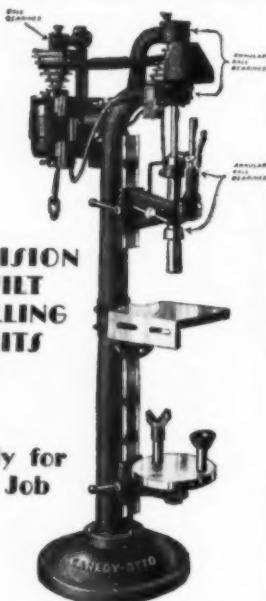
Wire-Working Machinery Wire Mill Equipment

Sleeper & Hartley, Inc.
Designers and Builders
Worcester, Massachusetts

CANEDY-OTTO

PRECISION BUILT DRILLING UNITS

**Ready for
the Job**



Featuring the 6-speed C-O No. 3000 F-V Sliding Feed Sensitive Floor Drill, this sturdy, dependable unit is accurate and flexible over a wide range of drilling operations.

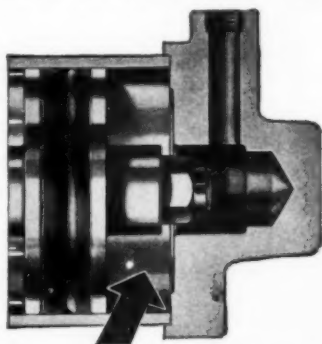
Full ball bearing spindle—self-aligning ball bearing on motor bracket—sliding motor mounting for belt adjustment—double hinged bracket for quick speed changes—these are some of the attractive features.

The C-O Line comprises a full range of precision drilling units, single and multiple spindle. The C-O-Matic Power Feed is also available. Complete stocks at New York and San Francisco Branches.

Send for bulletins giving full information.

CANEDY-OTTO MFG. CO.
CHICAGO HEIGHTS, ILL.

inate the metal-to-metal impact common to non-cushioned cylinders. Prolonging cylinder life is one of the purposes of this new built-in air cushion.



At the same time, it is said to assure smoother, quieter, more efficient operation and lower maintenance costs for all air powered equipment. These benefits are claimed to have been proved definitely by exhaustive performance and endurance tests under actual working conditions.

Of course, Nopak air cylinders with adjustable cushion-heads are recommended by the manufacturer for those applications where accurate control of "cushioning" is required at the end of the piston stroke.

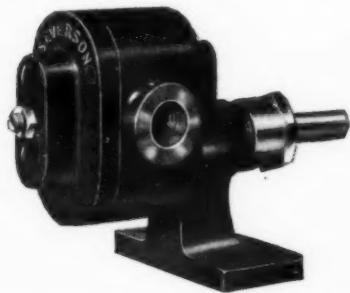
A complete new illustrated bulletin giving full details of both the new non-adjustable type of cushioned air cylinders as well as the adjustable type is now ready for distribution to responsible executives. Write the Galland-Henning Manufacturing Co., S. 31st Street, Milwaukee, Wis., and kindly refer to The BLUE BOOK.

Severson Gear Pump

Self-take-up of wear is one of the appealing claims made for the new Severson Gear Pump, developed by The East Shore Machine Products Co., 833 East 140th St., Cleveland, O. As gears and bores in the case wear, a taper construction is relied upon to maintain a close fit.

General construction of the pump is

extremely simple. Two tapered bores in the case house the gears. The latter are two intermeshing, hardened and ground gears with accurately cut teeth. The hardened and ground steel take-up plate contacts the gear ends on one surface while the other side rests against a helical spring. A screw permits adjustment of the spring tension, secured by a locknut. Shafts are of hardened and ground steel and bearings are drilled and reamed in case



and cover. Pumps are built of nickel cast iron, bronze, stainless steel and are engineered for specific requirements. Mounting can be in horizontal or vertical position.

It is stated that no priming is necessary and that no check valve is needed in intake. Also, that the pumps will deliver high pressures—and high efficiency at comparatively low speeds.

They are recommended for handling water, light or heavy oils, coolants,

chemicals, gasoline or for hydraulic service with light or heavy liquids. It is asserted that the pump will withstand pressures up to 500-lbs., and that it will lift liquids 25 feet. A test is said to have shown a maximum loss of only .02 of a minute from 0 pressure to 100-lbs. pressure.

Address the makers for copy of new bulletin S-10, giving full details—and kindly mention The BLUE BOOK.

"POWERMASTER"

GIVES YOU . . .

An infinitely variable speed range under instant finger-tip control—freedom from belt shifting and ability to locate machines exactly where desired, independent of lineshaft. Operation is speedier and more flexible and production costs are reduced.



"POWERMASTER" is readily attached to most machine tools with a simple four-bolt mounting.

UNCONDITIONALLY GUARANTEED—

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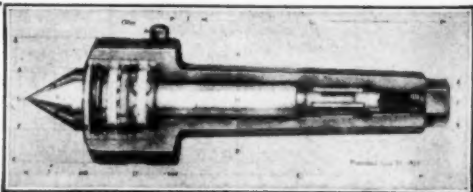
"POWERMASTER"

25 East Fourth St., New York, N.Y.

HEAVY DUTY LIVE CENTERS

Especially adapted for heavy work. Equipped with a combination of precision type ball and roller bearings to assure rigidity and maximum capacity for high speed production and longest possible service. Bearings can be renewed if necessary at slight cost.

Write for our catalog of live centers and tailstock spindles.



NIELSEN, INC., LAWTON, MICH.

Landis Builds Special 5 Inch Tap

The illustration shows a special 5 inch tap with replaceable chasers which was recently designed by Landis Machine Co., Waynesboro, Penna.



It is intended to be used in conjunction with special die heads, also made by Landis, for producing the screw mechanism which will operate the con-

trol gates of a large dam, now under construction in the West.

The tap will be used for finishing and sizing after the threads have been "roughed out" on a lathe. The thread is of the Acme form 5" diameter, $\frac{3}{4}$ inch pitch, $1\frac{1}{2}$ inch lead, with a depth of .346 inches. Note in the illustration the coarse pitch and the great depth of the thread as compared with an ordinary 6 inch scale.

The tap body, which is 30 inches overall in length, is made of alloy steel and has been precision ground after heat treating to insure accuracy. The chasers are securely locked in the correct cutting position by means of three hollow head set screws. The chasers can be easily taken from the tap for regrinding by unlocking the three retaining screws and removing the face plate to permit sliding the chasers forward.

Black & Decker Holgun

Here's a new drill that is a worthy addition to the Black & Decker line of fine tools—the Holgun.

It is recommended for its proportions, balance, compactness and rugged power. It is offered as a heavy duty production unit, made of quality materials to give maximum life with minimum servicing.

The features include:—full anti-friction bearings throughout for maximum power at the spindle; heat treated spindle of alloy steel, with splined mounting of spindle gear; fool-proof ventilation with three screened inlets, any two of which provide ample cooling; "Pistol Grip and Trigger Switch" for easy control with either right or left hand operation. Simplicity of construction and assembly gives convenient access to any part for inspection and servicing.

The capacity in steel is given as $\frac{1}{4}$ -inch; the no-load speed is 1700 r.p.m., the net weight is $2\frac{3}{4}$ lbs. and the overall length $6\frac{3}{4}$ -inch. The universal motor operates on A. C. or D. C.

Catalog sheet, giving detailed information, may be had by addressing The Black & Decker Mfg. Co., Towson, Md., and mentioning The BLUE BOOK.

— G E A R S —

**Spur—Helical—Worm—
Bevel—Miter, Etc.**

We do broaching and all kinds of grinding.

We specialize in grinding hardened steel bushings, cam rollers, etc.

Prompt service and quality has retained a large list of customers for 25 years.

TAYLOR MACHINE CO.

1919 E. 61st St.,

Cleveland, Ohio

Universal Spring Coiling Machine

A forward step in the design and manufacture of wire coiling machinery has just been taken by Sleeper & Hartley, Inc. of Worcester, Mass.

The "step" has resulted in a coiler that is said to be unique and highly efficient, for which a patent has been applied.

Heretofore, the makers explain, control of pitch and diameter have been

adjusted by reaching inside—with uncertain results. The new coiler has a recessed cabinet on front side (covered by a hinged door) and it is from this accessible point that such cam controls are operated.

In case of a change or special spring, both pitch and diameter cams may be shaped, timed and affixed to the cam hub which, as an entire single unit, may be removed from the shaft. One-piece solid cams may be used on this removable cam-hub. Other convenient



BERKELEY Floating Disc Valves

Proven in performance through years of faultless operation, Berkeley valves provide the last word in design and construction—a ready and satisfying solution of valve problems.

The perfectly lapped operating surfaces are held together by spring pressure slightly in excess of that tending to separate them, affording a balanced floating action with a minimum of surface pressure, freedom from wear and ease of operation.

The design and construction readily permits modification to meet individual needs. Valves can be supplied for hand, foot, mechanical or electrical operation.

Quickmail Coupon No. 59 will bring your copy of new valve bulletin, giving full information.

Check These Advantages:

- 1—No packing or gaskets.
- 2—Balanced Disc Pressure.
- 3—Disc Operation independent of stem or handle alignment.
- 4—Perfectly lapped operating surfaces.
- 5—Ball thrust bearing on stem.
- 6—Full or variable port openings.
- 7—Efficient, easy operation under all pressures.
- 8—Simple in design.

Backed by 20 years' experience in valve designing.

BERKELEY ENGINEERING CO.
1381 E. 17th ST., CLEVELAND, OHIO

controls include:—Individual pressure for each pair of feed rolls; Individual, simple adjustment for cutter alignment instantly adjusted from upper to lower cutter shaft; Micrometer adjustment of compound blocks; Pitch-stop conveniently located and quickly adjustable.

Other improved features include:—One-piece housing for rigidity and alignment; Ball Bearing construction throughout (on all rotating shafts); Multi-pawl ratchet for increased accuracy of feed; Single cutter operation

—directly connected for strength and rigidity. Wear-Free diameter slide connection; Removable crank—for set up purposes; Variable Speed transmission for production range—if desired; Tooling interchangeable with previous models.

The improvements are claimed to result in material increase in capacity. Maximum .080-in., diameter music or oil tempered spring wire. Maximum 48-in. feed (wire length per spring). Double feed — 96-in. — using .041-in.

BALDOR

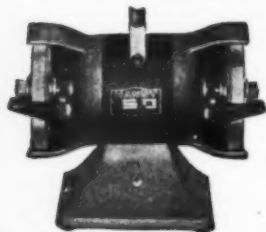
BALL BEARING GRINDERS

**X T R A
STURDY
BUILT**

A Complete Line—6" to 12"

BENCH AND PEDESTAL TYPES

\$19.50 to \$197.00



**1 YEAR
GUARANTEE**

HEAVY DUTY—BALL BEARING

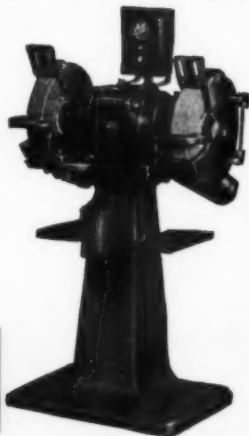
ABOVE, No. 548, 1/4 H. P. \$ 19.50

AT RIGHT, No. 121, 2 H. P. \$197.00

MAIL QUICKMAIL COUPON No. 18

BALDOR ELECTRIC COMPANY
4368 Duncan Ave., St. Louis, Mo.

BALDOR GRINDERS
are built by Motor Specialists



ICERS



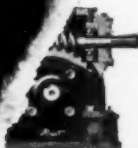
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Gears and Gears are made of
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Abart Gears have ex-
tra life—they are quiet
and will reduce main-
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machines. Immediate
service—send specifi-
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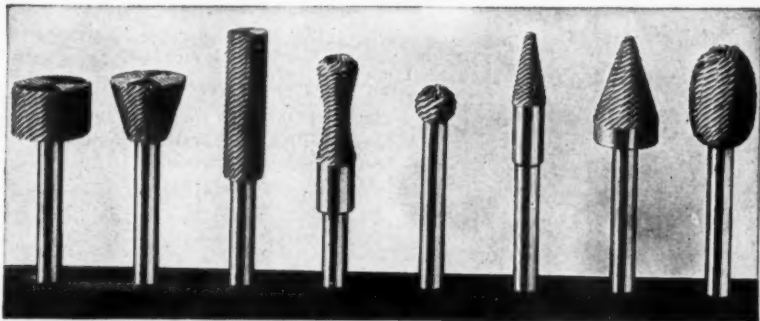
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MANUFACTURERS OF
Speed Reducers & Gears
412 WEST 12TH ST. CHICAGO, ILLINOIS

Ford Hand Cut



Rotary Files



Just a few of the many standard shapes which are carried in stock

Send for catalog and full information

**413
PERSHING AVE.,**

M. A. FORD MFG. CO.

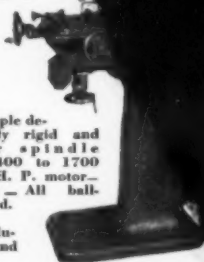
**DAVENPORT,
IOWA**

JOHNSON

Two

One spindle is built into the knee beneath the vise table. The other, or top spindle, is mounted in a swinging head. This machine is designed for all types of rapid and accurate milling operations. Simple design — extremely rigid and efficient. Four spindle speeds from 400 to 1700 R. P. M. $\frac{1}{2}$ H. P. motor — V-belt Drives — All ball-bearing equipped.

Write for illustrated folder and prices.



Johnson Tool Co., Inc.
East Providence Rhode Island

NEW!

**A Variable
Point—Variable
Clearance Drill
Pointer by
Oliver of Adrian**

Let us send full details.

OLIVER INSTRUMENT CO.

1408 E. Maumee Street

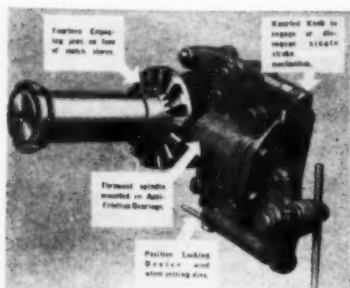
Adrian, Michigan

Check these advantageous features of the NEW Oliver 510 Drill Pointer:

- 1—Increased capacity for drills $\frac{1}{4}$ to 3-inches.
- 2—Timken Bearing Grinding Spindle.
- 3—Automatic Operation.
- 4—Positive Clutch Drive to Chuck.
- 5—The PATENDED Oliver point with Variable Clearance.
- 6—Improved Motor Drive.
- 7—Heavier Cuts, Faster Cuts, Less Grinding Time.
- 8—A Drill Point that will work efficiently on any metal.

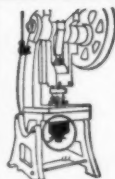
crank presses up to and including 6½-inch diameter shafts.

It is claimed that in addition to providing increased clutch capacity, the instant engagement and elimination of varying time lag between depressing the treadle and actual clutch engagement results in more strokes per hour and greater safety.



Fourteen engaging jaws distributing the load over the striking surface; throwout mounted on anti-friction bearings; hardened and ground engaging jaws; these are a few of the design features. Instant engagement enables the operator to synchronize the motions of his feet and hands.

Complete information on Niagara Presses and Shears equipped with this sleeve clutch is available by writing the Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y. We'll appreciate it if you mention The BLUE BOOK.



Equip your presses for deep drawing work for as low as low as \$75, complete.

Write for our engineering booklet on deep drawing die work.

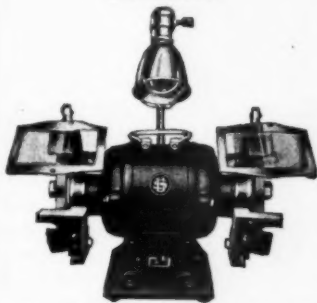
Dayton Rogers Mfg. Co.
Minneapolis, Minn.



Vimco LIGHTS "THE SPOT"

on

**The United States
Electrical Tool Co.
6" Deluxe Bench
Grinder**



Direct, localized illumination — VIMCO-LIGHT is essential for close work on machine tools such as the United States Electrical Tool Company's 6-inch Deluxe Bench Grinder. That's why the makers of this — and a vast number of other modern machine tools have adopted VIMCOLIGHTING as standard equipment.

Makers and users of modern tools are commencing to realize that VIMCOLIGHTING is a vital factor in stepping-up production — in improving the products — in avoiding accidents and mistakes.

Complete VIMCO equipment costs as little as \$1.55 to \$2.35. Order NOW, or write for full information.

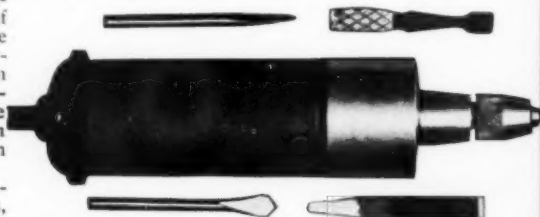
VIMCO MFG. COMPANY, Inc.
109 Chenango Street, Buffalo, New York

Hoover Multi-Purpose Electrical Tool

Something new in the way of an electrical hand tool is offered by the Hoover Tool Co., Anderson, Ind., for filing, chipping, routing, sawing, cutting and chiseling operations. The chief point of difference is that the Hoover delivers a powerful reciprocating motion (back-and-forth—not rotary). The makers rate its capacity as $\frac{1}{8}$ -inch in chipping, and $\frac{1}{4}$ -inch in filing or sawing.

The tool is recommended for die makers, engravers, pattern makers and artists in stone, bronze and aluminum.

The Hoover lends itself to use with a wide variety of cutting tools, four typical examples of which are shown.



The tool is small, compact, light, well-balanced and fits the hand nicely. Workmanship and material are fully guaranteed by the makers. Please address them for further information and you can save time and trouble by

using Quickmail Coupon No. 44. Dealers' inquiries are especially invited.

"Radicon" Worm Reducer

Thomas Prosser & Son, 120 Wall St., New York, have been appointed exclusive U. S. distributors for the

SHELDON ARBOR PRESSES

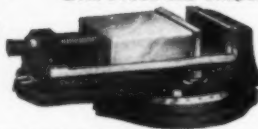


12 sizes— $\frac{1}{4}$ to 10 tons.
Bench and Floor Models,
Simple or Compound
Leverage. Alloy steel rack
and Gear.

Milling Machine
Drill Press and Shaper

VICES

Plain or
Swivel—
5 types.

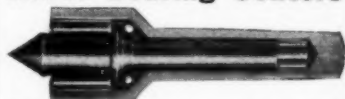


Write for Catalog and Prices.

Dealers: Some Choice Territories still open

SHELDON MACHINE CO.
3257 S. Cottage Grove Ave., Chicago

Something entirely new in Economical Live Ball and Roller Bearing Centers



For lathes, hand screw machines, grinders and mills. A simple and yet practical construction.

Long, sturdy heavy-duty spindle. Radial roller bearing in front end of spindle for smooth operation and strength. Roller bearing in back end of spindle for free-running and alignment.

Vee and angular thrust ball bearing to insure constant accuracy and be absent from chatter and end-play. Large spindle, small head and short over-hang spells rigidity.

Equipped with special seal to retain lubricant and keep out foreign matter.

A lower cost to you than any other live center on the market.

A folder giving prices and complete detail will be mailed to you just for the asking.

Send us your order for one today and we will give you a ten days free trial and if not satisfactory in every way just return it.

MOTOR TOOL MFG. CO.

12281 Turner Ave., Detroit, Mich.

"Radicon" Worm Reducer, developed by David Brown & Sons of Huddersfield, England. This is claimed to be the most outstanding development in worm gearing since 1903, creating a new standard of efficiency in worm gear performance.

It is asserted that the safe rating of



the Radicon Reducer has been increased so that a 30% reduction in size

is possible for any given duty, resulting in lower first cost. A 50% reduction in oil drag contributes to increased efficiency and lower running cost. Automatic oil circulation is said to eliminate need for attention and maintenance costs.

All bearings are positively lubricated. A continuous oil circulating system, effective from the lowest speeds, works in both directions of rotation and provides positive automatic lubrication.

BURKE

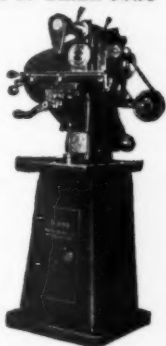
MILLING MACHINES

Make Fast Work of Small Jobs

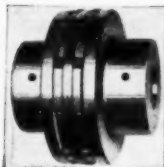
Motor
Driven

Timken
roller or
ball bearings to
spindle

Write today for
circulars.



Burke Machine Tool Co.
297 E. 16th St.,
Conneaut, Ohio



Type "W"

COUPLING TROUBLE?

Investigate Type W. Puts an end to tie-ups, misalignments, breakage, lubrication, supervision. Adjustable without tear down of coupling. 1 3/4" to 1 1/4" shaft sizes. Write for details.

**L-R FLEXIBLE
COUPLING**

**LOVEJOY FLEXIBLE
COUPLING CO.**
5026 W. Lake St., Chicago

**GROUND FROM THE
SOLID after hardening**
H. S. May Be Reground



Write
for your
free copy of
our beautiful
Catalog No. 12.

SEVERANCE Midget Milling Cutters Save 75% On Many Jobs

One tool engineer said, "We are just waking up; we've half a million uses for your tools."

Why put up with grinding dust, hand filing, obsolete rotary filing, etc.? Let Severance Engineers survey your jobs. Our cutters have a MONEY BACK Guarantee.

Another engineer writes, "I could not get a cutter to stand up until your cutter came out. (They ARE real.)"

Severance Tool Manufacturing Co.
1510 Genesee
Saginaw, Mich.

Drill Grinding Attachment

fits Black & Decker and Van Dorn grinders, sharpens twist drills correctly. Price only \$18.

C. H. Carlson Mfg. Co.
13-15 Main St., N. E.
Minneapolis, Minn.

Write for
bulletin



The Grinder With The Micrometer Stop

Plain 4" by 8" bench grinder.

Universal—8" by 10½" bench grinder, with internal spline-cam-cutter grinding attachments.

Crystal Lake Machine Works
Established at Crystal Lake, Illinois

Since 1910

Leakage is prevented by double-wall oil baffles and flingers.

Efficient cooling is credited as the dominant factor in the great increase in load-carrying capacity. All processes of heat transference are employed: radiation due to great increase in surface area; convection from upper housing resulting from vertical ribbing; conduction by fan projecting a stream of cold high velocity air along the horizontal channels.

The patented shape of gear tooth, in conjunction with the special cooling methods is claimed to assure higher powers with normal temperature rise, up to 100% increase in load-carrying capacity.

Mr. Wilfred Duxbury, who has been in charge of the Gear Dept., of David Brown & Sons in England, has joined the staff of Thomas Prosser & Son, and his knowledge of the business, together with the facilities of the engineering staff of Thomas Prosser & Son, is now available to American industry.

A complete stock of various sizes of Radicon Reducers is carried for immediate delivery. Cone-ring patented couplings and base plates are also available.

Catalogs and complete information will be furnished on application. In writing, please save time and trouble by using Quickmail Coupon No. 57.

For BUSHINGS

QUALITY

- *Close Limits* of hole size held with Ex-Cell-O Precision Grinding Spindles.
- *Tool Steel*, wearing surfaces hardened to 62-64 Rockwell "C," for long life.
- *Strictly to ASA Standards* for Drill Jig Bushings.

Plus SHIPMENT IN 24 HOURS

from our stock of over 250,000 standard bushings.

Keep inventories down—let our Bushing Catalog be your stockroom. Reduce drill breakage by using accurate bushings. Write for specifications and low prices. EX-CELL-O CORPORATION, 1188 Oakman Blvd., Detroit, Michigan



EX-CELL-O

Gilman Combination Four-in-One Tool Room Machine

Four practical, precision tools are combined in the compact, versatile new Gilman Four-in-One Tool Room unit: (1) a precision lathe; (2) vertical mill; (3) horizontal mill and (4) sensitive drill.

All of these are said to be designed for operation within precision limits of .001-inch.

The lathe has a 9-inch swing, is 12-inches between centers with a 24-inch bed. Tailstock is adjustable to take-up for wear. An attractive feature is the patented device for instant clamping of the compound rest at any position on the lathe bed.

The horizontal mill has a 4 x 18-inch

table, with 10-inch travel. The quill may be raised or lowered 4-inches.

The horizontal mill and lathe are powered by a reversible motor of one h.p., capacity, mounted in base. There are eight spindle speeds of from 80 to 3500 r.p.m.



The sensitive drill has an 8½-inch table with 7½-inch clearance between table and spindle. A Jacobs chuck is provided.

The vertical mill is provided by swinging the drill around and locking it over the milling table.

The drill and vertical mill are

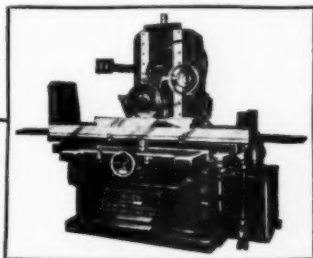
powered by a ½ h.p., reversible motor and spindle speeds range from 390 to 2200 r.p.m.

Timken bearings are used throughout.

The machine weighs approximately 1,000 lbs., and is finished in an attractive fine baked art crackle finish.

Vimcolighting assures proper illumination of work.

For complete information, please address the Gilman Engineering Works, Janesville, Wis., using Quick mail Coupon No. 49.



New No. 55 Grand Rapids Hydraulic Feed Surface Grinder

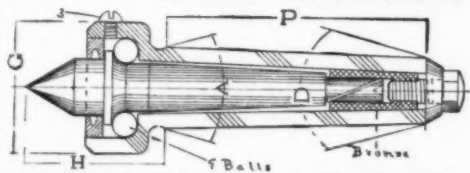
This and many other sizes described in new Bulletin GL100. Now is the time to invest in equipment which will enable your men to earn more.

GALLMEYER & LIVINGSTON CO.

405 Straight Ave., S. W.

GRAND RAPIDS, MICHIGAN

The New RIGID RESILIENT LIVE CENTER



Rigid Tool Holder Co., 2,000 Witherell St., Detroit, Michigan

Eliminates front-end-retainer, and gives access to deep packing groove, filled with wound woolen knitting thread, saturated with clean solidified oil, which will lubricate indefinitely.

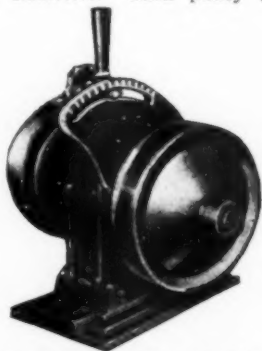
Otherwise it maintains the enviable construction of the original Rigid Resilient Live Center.

All Morse tapers are carried in stock.

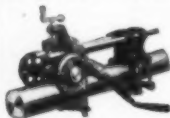
Columbia JFS-Jr. Vari-Speed Control

Columbia Vari-Speed Co., Liberty Bldg., Wheaton, Ill., offer in the JFS-Jr. Vari-Speed Control, a new and improved application of the variable pulley principle. The unit consists of two interlocking, variable pulleys mounted on a single shaft. To change the speed, the pulleys and shaft are pivoted laterally through a determined arc toward or away from the drive or

driven pulleys by means of the control handle. As this change is made, the resulting belt tension in the one belt, and the slack in the second automatically adjusts the pulley diameters to give a new ratio between their running diameters. Each pulley is de-



BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

JOHN T. BURR & SON
429 Kent Ave., Brooklyn, N. Y.

pendent upon the other so they are perfectly adjusted in all positions.

"If it's a Spot Welder, we make it"—from a filament .0005" to a door welding.

We manufacture the most complete line of standard and special electric spot welders from $\frac{1}{4}$ to 500 K. V. A., some as low as \$25.00.

We also manufacture special welding transformers to suit your requirements.

Ask for our catalog No. 38W showing over 1250 interesting illustrations—press type air operated, plungertype foot operated and motor driven welders.

Send us your welding problems for quotations.

We manufacture a very complete line of welding tips and water-cooled electrode holders for difficult welding jobs.

We also do Job Spot Welding.

EISLER ENGINEERING COMPANY, Inc.

762 So. 13th St., Near Avon Ave., Newark, New Jersey

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SPOT WELDING

**FOR STRONG
ACCURATE
COMPACT
AIRCRAFT
WORK**

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**CLUTCH OR
CONE DRIVE***Our High Speed Tappers
are Super-Sensitive for
Small Tapping**Style D-E, Quick Change Tools*

This mutual compensation relieves belt strain. The drive is not spring loaded. A light spring is placed in the one hub to compensate for any installation inaccuracies which might be made.

Elimination of thrust loads, by means of the single shaft design, oversized, sealed ball bearings, large grease chamber, etc., help to make the JFS-Jr. unusually efficient. Actual tests are said to show an efficiency of over 20%.

Alignment of the belts is maintained in all positions by means of the special base mounting which automatically centers the variable pulleys with the drive and driven pulleys. Standard V-belts are used. The JFS-Jr. is made in sizes from fractional to 7½ h.p.

Address the makers for bulletin giving full details. For your convenience use Coupon No. 58.

**Ideal Brush Type Wire
Stripper**

A motorized Brush Type Wire Stripper especially designed for rapid, fine

wire stripping is offered by the Ideal Commutator Dresser Co., 1441 Park Ave., Sycamore, Ill.

This machine cleanly strips cotton, silk, enamel, string asbestos covered wire, fine "Litz" wires and removes gummy insulation embedded in stranded wires. Especially suitable for stripping rectangular or square conductors. Driven by a ¼ h.p., motor, this stripper eliminates tedious hand-scraping, does a faster, cleaner job more economically.

It is easy and safe to operate. Heavy metal guards in front of the revolving wire brushes and over the driving belts protect the operator's fingers. A thumb adjustment screw varies the distance between the brushes for various sizes of wire, while an adjustable stop behind the brushes fixes the length of stripping.

Simply plug into convenient 110 volt, 60 cycle outlet, push the start-stop switch and the stripper is ready to use.

INDEX No. 38

High Speed Vertical

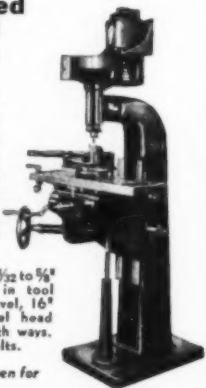
Low initial cost and maintenance.

Simple and easy to operate—no gears to clash — no gadgets to break. Hand feed through a table designed in proportion to the capacity of the machine enables the operator to feel the progress of the cutter.

Six spindle speeds, $\frac{3}{32}$ to $\frac{5}{8}$ " end mill capacity in tool steel. 8" cross travel, 16" longitudinal. Swivel head graduated 90° both ways. Operates on 110 volts.

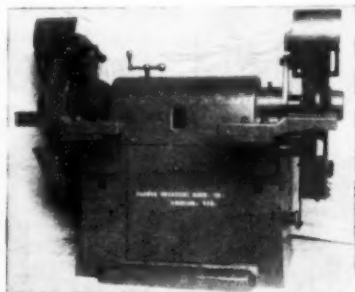
Good territory open for dealers.

John Blank Machinery
JACKSON MICHIGAN



Ransom Constant Periphery Speed Grinders

In offering their new Type D unit, Ransom Grinding Machine Co., Oshkosh, Wis., call attention to the loss of efficiency when grinding wheels are



operated at improper speeds. Common practice has been to start the full size wheel at the proper speed, but as the wheel wears down, it is soon running

LIGHT ?



CHICAGO
"ADJUSTABLE"
SHOP-SPOT-LIGHT

Places Light Where Light is Needed

MODELS FOR OFFICE,
FACTORY, DRAFTING
ROOMS, ETC.

Catalog furnished on request

CHICAGO DIE CASTING MFG. CO.

2502 W. Monroe Street, Chicago, Illinois

too slowly which reduces the amount of work that can be done. There is also a loss in the amount of usable abrasive as wheel wear is said to be faster when operated at too low a speed.

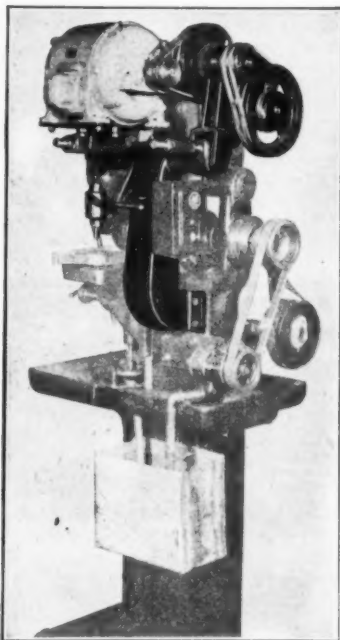
The Type D grinder overcomes this by making it possible to maintain a constant peripheral speed as the abrasive wheels decrease in diameter.

A ball bearing motor of 5 or 7½ h.p., totally enclosed, fan cooled, A. C. or D. C., can be used.

Starter is a G-E across-the-line, remote control type with overload and under voltage protection, mounted in base, with convenient push button control.

Speed changer unit is made by Allis-Chalmers, fan cooled and mounted in base.

Texrope drive is furnished in the speed changer unit. Drive to spindle is by Texropes so arranged that by removing the left hand wheel and a small guard at front, ropes can be re-



Modernize with **BERKELEY** Drives

Built specifically for your machines . . . to bring you new standards of efficiency and flexibility . . . and sturdily constructed to outlast the machines, Berkeley Drives are readily attached by four bolts, and screw adjustment for lining-up. These surprising-low-priced "Standardized Special" Motor Drives become an integral part of your lathes, drills, grinders, shapers, milling machines . . . soon pay for themselves and thereafter show a profit.

The new Berkeley Tension-Trol (multi-range tension control mechanism) gives you the exact belt drive tension required, giving you improved power transmission and increased belt efficiency on long or short centers.

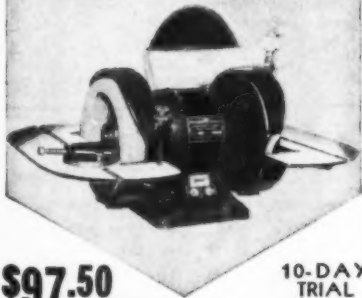
Get our Engineering recommendations — no obligation.



Quickmail Coupon No. 15 will bring your copy of the new Berkeley catalog—fresh from the press.

BERKELEY ENGINEERING CO.
1381 E. 17th ST., CLEVELAND, OHIO

PROSSER Cemented Carbide- Tool Grinder



\$97.50
COMPLETE

10-DAY
TRIAL
OFFER

INCREASES TOOL LIFE REDUCES TOOL BREAKAGE

This modern Cemented Carbide Tool Grinder not only removes metal fast when rough grinding but also finish grinds tools to smooth, keen cutting edges. A diamond wheel can be used for finish grinding instead of silicon carbide wheel regularly furnished.

When equipped with proper wheels, this grinder is unexcelled for the proper grinding of high speed steel, Stellite, and all other types of cutting tools.

Write for details.



placed easily.

The plate steel guards are said to comply with all safety codes and State safety requirements.

Rests are adjustable in all directions and have steel lined surfaces, renewable when worn.

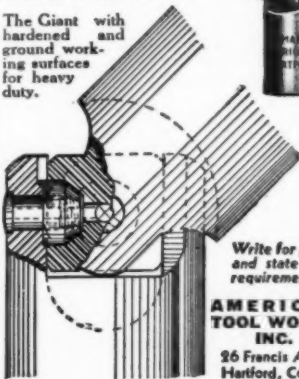
All running parts are ball bearing mounted.

Speed control is accomplished by turning hand wheel shown on top of machine. This brings the levers shown in the upper inside part of each wheel guard in contact with lug on spark arrestor, automatically regulating the speed changer unit to give the proper speed for the diameter of wheel at the time adjustment is made. Adjustment may be made while machine is running. When lever touches lug, the hand wheel cannot be turned farther, making it impossible to obtain a speed above 6400 surface feet per minute. The 24-inch wheels at 1000 r.p.m., can be worn to 12 or 13-inches diameter running at 1850 r.p.m., thus maintaining a constant periphery speed of 6400 feet, after which they can be worn to 10 or 11-

VANDERBEEK UNIVERSAL JOINTS

The Baby Giant for instrument and control work.

The Giant with hardened and ground working surfaces for heavy duty.



*Write for prices
and state your
requirements*

**AMERICAN
TOOL WORKS
INC.**

26 Francis Ave.
Hartford, Conn.

inches without further speed control adjustment.

Motor and speed changer unit are mounted in rear, so as to be accessible by removing cover.

For further details, please address the makers—and for your convenience please use Quickmail Coupon No. 69.

Buffalo Model "C" Breezo-Fin Unit Heaters

Buffalo Forge Co., 161 Mortimer St., Buffalo, N. Y., contribute a number of refinements in their new model "C" unit heaters. To a considerable extent, these have to do with streamlining and eye appeal.

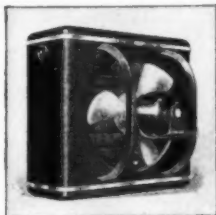
The die-stamped casing is free from sharp corners. A new motor mounting, stronger and more rigid, permits the use of various motors. Rubber silencers subdue motor vibrations.

There are also construction changes which make for improved performance.

The fan has been redesigned and is said to give greater capacity with less "air noise". The hub is die-shaped

with sturdy, riveted-on blades.

The pressed steel louvres are readily adjustable.

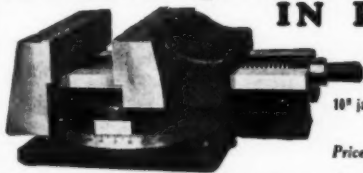


Heater element is a one-piece seamless copper tube with square, copper fins, spaced for maximum radiation. Inlet and discharge connections are outside the unit, precluding inside leaks.

Five sizes are available, ranging from 12 to 24-inches. Each may be had with single or double rows of coils.

Please address the makers for further details, and we'll appreciate mention of The BLUE BOOK.

SUPERIOR QUALITY AND WORKMANSHIP IN PLUNKET VISES



SQUARE BASE SHAPER VISE

The Shaper Vise has graduated base and tongue in center to fit slot in table, and has holes for bolting down. In ordering this vise give size of slots in Shaper Table, also distance from center to center of slots.

10" jaws, 2 1/4" deep, opens 8 1/2". Weight 125 lbs. **\$46.80**

Our complete line includes Vises for Drill Presses, Milling Machines, Shapers and Grinders.

Prices are net, f. o. b. Chicago. Write for illustrated folder today. Dealers wanted in unoccupied territory.

J. E. Plunket Machine Co. 1823 W. Lake Street
Chicago, Illinois

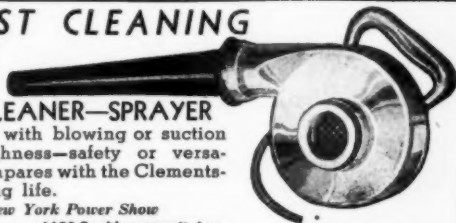
FOR LOW COST CLEANING Use the CLEMENTS —CADILLAC

BLOWER—SUCTION CLEANER—SPRAYER

No type of cleaning compares with blowing or suction for speed—economy—thoroughness—safety or versatility. No portable blower compares with the Clements-Cadillac for efficiency and long life.

See It at Booth No. 563 New York Power Show

CLEMENTS MFG. CO. 6650 So. Narragansett Ave.
CHICAGO, ILL.



Ask for **FREE Trial**

Holo-Krome Prepares Sales Merchandiser Assortment

The Holo-Krome Screw Corp., Hartford, Conn., endeavor to meet the dealer and customer requirements for a compact safety set screw and wrench display carton. This brilliantly colored, cut-out counter display, presents popular sizes of safety set screws that fit household articles such as: oil burners, sewing machines, bicycles, lawn

mowers; farm machinery, dairy products and equipment and countless other uses in machinery repair shops, garages, tool rooms, "fix it shops", refrigeration service shops and maintenance work in industrial plants.

Individual boxes, plainly marked for each screw and wrench invite customer

IF YOU USE TAPS YOU NEED WALTON TAP EXTRACTORS

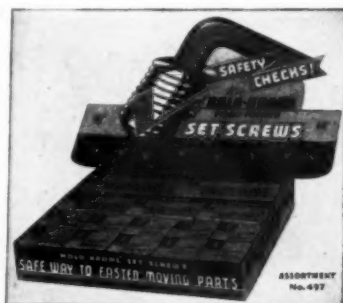


They remove taps broken at or below the surface of the hole easily, quickly and without injury to the threads.

Send for Folder 132 giving sizes, styles and prices.

Test their worth by 30-day Free Trial.

The Walton Co.
95 ALLYN STREET
HARTFORD, CONN.



inspection and quick selection by the merchant of sizes desired by the customer.

Assortment No. 497 contains 144 safety set screws in sizes from No. 10x3/16 to 1/4x1/2 in. Also 48 safety set screw wrenches. Size of carton is 9 1/4 x 8 x 1 1/4 inches. Weight in protective shipping container—3 lbs.

In writing for further information please mention The BLUE BOOK.



THE M-B COMBINED AUTOMATIC AIR LINE FILTER AND LUBRICATOR

First removes from 96-97% of water, dirt, scale, etc., in air line, then delivers a mist of oil into the clean air going through the bearings of air tools.

Removes the guess work from the lubrication of air tools, smooths tool operation, eliminates costly shut downs and lengthens tool life.

Write for details.

Also Furnished As Separate Units

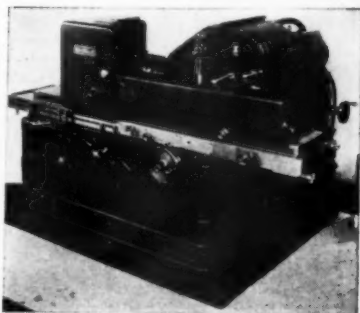
M-B PRODUCTS, 130 E. Larned St., Detroit, Mich.

Ex-Cell-O Improves Series 35 Production Thread Grinders

A line of improved series 35 production thread grinders is offered by Ex-Cell-O Corp., 1188 Oakman Blvd., Detroit, Mich. These include such features as temperature control for the coolant for increased precision; a new method of dressing grinding wheels, using interchangeable cams for different thread forms; greater rigidity by elimination of over-hanging supports; ability to grind in both directions, eliminating time lost during return stroke; lead compensation for maximum accuracy regardless of room temperature; provision for grinding tapers up to 2 inches per foot; provision for truing grinding wheels without slowing down the wheels, etc.

The ability to grind in both directions is made possible by an endwise shifting of the lead-screw, eliminating back-lash, as the hydraulic motor driving the work spindle is automatically

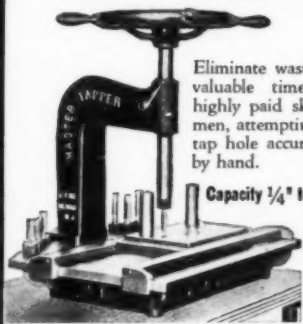
reversed at the end of each stroke. This shift is said to be accomplished so fast that the work spindle and direction of cut may be reversed while the wheel is still in the cut, eliminating



need for either an undercut—or running the wheel off the end of the work.

Another feature is the infinite variability as to speed of the hydraulically operated work spindle. This permits

Precision Tool Room Tapping SAVES TIME—TAPS—TROUBLE



Eliminate waste or valuable time by highly paid skilled men, attempting to tap hole accurately by hand.

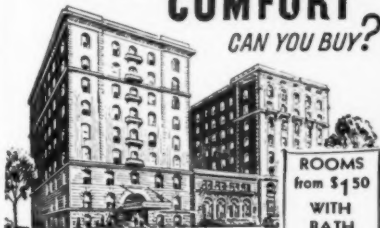
Capacity $\frac{1}{4}$ " to $\frac{7}{8}$ "

The Master Tapper Co.
2 Main St., Belleville, N. J.

HOW MUCH

COMFORT?

CAN YOU BUY?



• A wonderful bed; a clean, quiet room; pleasant, efficient service; and a friendly atmosphere — these are what you get, and all you pay for, at the Madison-Lenox. No frills—just genuine comfort and consequently, genuine economy. An excellent location, with garage nearby.

ROOMS
from \$1.50
WITH
BATH
\$1.75
also
WEEKLY
RATES

VERNON W. McCoy, Gen. Mgr.

Detroit

HOTELS MADISON AVENUE AT
GRAND CIRCUS PARK
MADISON and LENOX

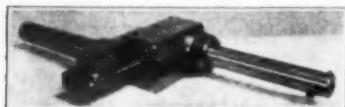
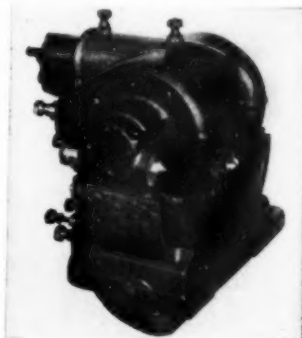
setting the machine to operate at the exact maximum speed possible for each job, instead of limiting available speeds to steps as with change gears. By this means, maximum production can be obtained regardless of the nature of the work.

Of particular interest is the attention given to insuring maximum accuracy. Not only is a lead compensator provided to take care of changes in the lead of the work due to room temperature or coolant temperature variations, but an oil cooler is also available to maintain constant coolant temperatures. The cooler is of tubular construction, enclosed in a sheet metal housing, mounted adjacent to the external coolant sump at rear.

In this connection, the new cam type universal dresser is of particular interest. Using the proper interchangeable cams, grinding wheels can be dressed to grind external threads with U. S. Standard, 60° Sharp, V, Acme, Whitworth and special thread forms. The unit is hydraulically power driven, operated by a lever at the front. After each dressing — removing a pre-

determined amount of wheel—the cross feed hand wheel is adjusted by its micrometer graduation to compensate for the amount of the dressing cut.

Provision of a lead compensator enables the grinding of screw threads having metric pitches on a machine equipped with screws and gearing designed for grinding standard U. S. pitches.



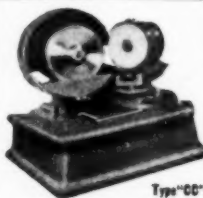
Why Not Modernize

your present equipment by using the RUSSELL BORING BAR? Bores holes from 9/16" to 12" dia. with axis of boring bar parallel to axis of the shank, in one compact tool, with micrometer adjustment.

RUSSELL BORING BAR CO.
MIDDLETOWN, OHIO

A special internal grinding attachment is available for backing off hobs, etc. The set-up permits the use of the smaller size grinding wheel that is necessary to make the grinding of this type of work practical.

No attachment is necessary for grinding taper threads in either direction of table travel up to 2 in. per foot. This is accomplished by swiveling the table, and correcting the lead by a simple adjustment of a hand knob on the front panel of the machine.



ROGERS Circular Knife Grinder

For circular or rotary knives up to 20" diameter. Unusually low price.

Type "CC" Write for bulletin CC.

S. C. ROGERS & CO.
205 DUTTON AVE., BUFFALO, N. Y.

Landis Die Heads Adaptable To Special Threading Operations

It is frequently necessary to change the design of a die head to meet some special production requirement. In the period of a year, Landis Engineers adapt a great many die heads to special threading operations.

Recently one of the large automotive plants required a head for cutting the thread on the front wheel upper control arm of their knee action assembly. This particular part is a steel forging and has a very odd shape. A sharp bend immediately back of the threaded section made it exceedingly difficult to adapt a die head of sufficient capacity to handle the required diameter and at the same time, clear the sharp bend to permit cutting a thread of satisfactory length.



The illustration shows the $\frac{3}{4}$ -inch Landex Type L Head which is being used to thread the "upper control arm".

A set of special wide chasers is employed. The chasers are milled off on an angle, as shown, to clear the bend in the "control arm". Likewise the chaser holders are beveled to eliminate any interference, or the possibility of their striking the "control arm" during the threading operation.

Address Landis Machine Co., Waynesboro, Pa., for additional information, and please mention The BLUE BOOK.

HAMMOND

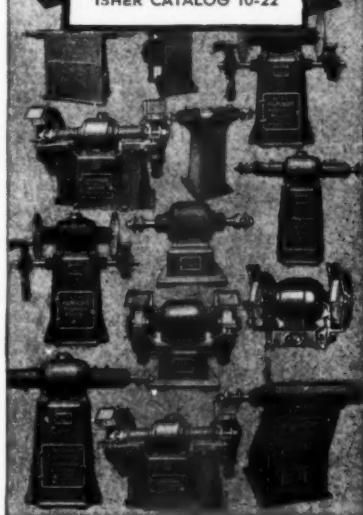
GRINDERS & POLISHERS

QUALITY PAYS

"Not even the expense of new bearings after 9 years of heavy duty service—has been our experience with the HAMMOND 24" Grinder you shipped us in June 1929.

"Considering the way this Grinder is operating, it may be many more years before we spend our first penny for repairs." International Spring Co., Chicago, Ill.

ASK FOR GRINDER—POLISHER CATALOG 10-22



Hammond Machine Builders
KALAMAZOO, MICHIGAN
Grinding, Polishing & Sawing Machinery

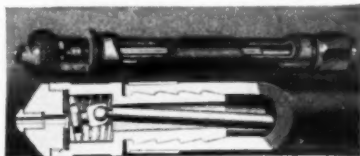
Air-O-Chek Announces New Valve

A new Air-O-Chek valve unit that screws on to the hose is announced by the Air-Way Pump & Equipment Co., 625 W. Jackson Blvd., Chicago. This handy air valve employs the unique Air-O-Chek ball and socket joint with enclosed actuating lever which eliminates protruding buttons or levers, as well as packing glands. All operating parts are shielded within the valve and air hose. A slight pressure between thumb and finger to flex the hose gives a big free-flowing volume of air with instant, positive shut-off when hose is released. It is furnished with either male or female fitting for conveniently attaching to and removing from hose. Made of bar brass and stainless steel for $\frac{1}{8}$, $\frac{3}{16}$, and $\frac{1}{4}$ -inch hose. A variety of nozzles is available for different types of work.

Developed for use in machine shops, furniture factories, textile mills, aircraft

and automobile factories, steel mills, foundries, service stations, garages and other industries where compressed air is used for blowing.

In writing for additional information, kindly mention The BLUE BOOK.



A Correction

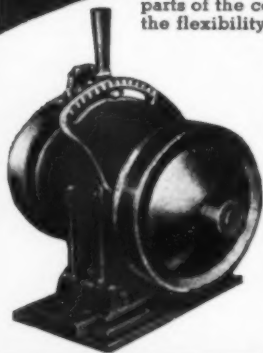
The mechanical features of the Landis No. 2 Race-A-Way Grinder were presented in the October BLUE BOOK. In some way, this new unit was credited to the Landis Machine Co., whereas it is made by the Landis Tool Co., Waynesboro, Pa. We offer our apologies to the readers, and to both Landis Companies.

Columbia's

JFS-Jr.

**VARI-SPEED
CONTROLS**

"Very Satisfactory"—That's what hundreds of users in all parts of the country say about JFS-Jr. And their repeat orders prove the flexibility and economy of this modern speed changing device.



JFS-Jr. provides an **infinitely variable speed selection** over a 5-1 or greater speed range, **with standard V-belts**. The simple, single shaft design eliminates unnecessary moving parts, increasing operating efficiency and decreasing the space necessary for mounting.

If you are a large or a small user of variable speed transmissions, you'll make no mistake in learning more about JFS-Jr. These units are **available in five sizes from fractional to 7½ h. p. capacity**, ranging in price from \$26.50 to \$98.00. They are readily applicable to all types of production machinery, new or old.

Write for descriptive bulletins giving full information.

COLUMBIA VARI-SPEED CO.,

LIBERTY BLDG.,
WHEATON, ILL.

A New Procnier Universal Tapping Machine

An addition to their line of universal tapping machines is announced by the Procnier Safety Chuck Co., 14 South Clinton St., Chicago, Ill. The new universal is designed as a high speed sensitive tapping machine, accommodating precision tapping over a large range of tap sizes.



One machine handles tap sizes from No. 2 to 5/16-in., in steel; 3/4-in. in cast iron, and 1/2-in. in brass, through the use of two interchangeable Procnier high speed precision tapping heads. The enclosed V-belt drive provides four speeds:—390, 745, 1280 and 2050 rpm, accommodating the entire range of tap sizes in the various materials.

Foot operating mechanism affords operator complete use of both hands

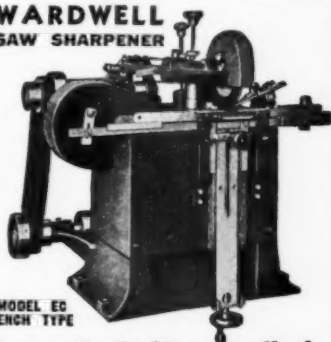
for handling parts. The extra long springs in the foot operating mechanism provide uniform pressure on tap both in driving and backing out; and compensate for difference between the travel of foot and lead of tap. Thus, the tap establishes its own lead, and tapped holes can easily be held to a very accurate fit. This feature provides for pre-set tap feeding and reversing pressures, adjustable to meet the exact requirements of the tapping job, independent of operator. Compression spring adjustments are made from the operator's tapping position.

Height of the foot pedal is adjustable, and spindle counter-balancing arrangement provides a very sensitive, easily operated foot control.

The automatic piston type lubricating device is said to supply the proper amount of cutting lubricant to tap at precisely the correct instant and has an adjustment for quantity of lubricant as well as for timing of the flow.

Table raising and lowering mechanism operates on ball bearings. Table locks in position.

WARDWELL SAW SHARPENER



MODEL EC
BENCH TYPE

Automatically Sharpens Hack, Band & Circular Saws

with teeth as fine as 32 to the inch,
at a speed of 30 to 75 per minute.

WRITE FOR CIRCULAR

The Wardwell Mfg. Co.
3165 Fulton Rd. Cleveland, O.

Conveniently located tool rack accommodates gages, taps, collets, wrenches, etc.

Adjustable lamp is furnished for proper illumination.

The tapping head clamps directly around quill and the short, rigid mounting helps assure accurately tapped holes.

The sensitive, double-cone, friction clutch accomplishes blind tapping just as easily as through tapping and instantly slips should the tap strike bottom or stick. The Tru Grip collet type tap holder is very small and light in weight, holds the tap securely, and is extremely accurate.

Production and accuracy can be increased on external threading jobs by equipping the tapping head with an Acorn die holder in place of the standard Tru Grip tap holder.

Machine is available with or without lubricating device.

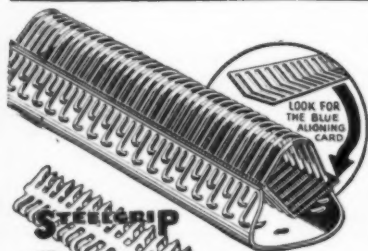
Please address the makers for further details and specifications—and kindly mention **THE BLUE BOOK**.

Cross Drilling on Screw Machines

John A. Feiten, Chief Tool Designer, Detroit Lubricator Co., writes concerning a very satisfactory method of drilling cross holes on an automatic screw machine, using Madison-Kipp Power Kipp Air Grinders. One of the difficulties encountered when electric motors were used, was eliminated due to the air grinders not being affected by the splashing of oil.

The majority of parts have been tooled up where the air grinder has been mounted in a bracket directly on the cross slide. As the stopping and starting of the machine spindle is almost instantaneous and the time required to drill, in most cases, is a second or fraction thereof, great savings are claimed compared to doing the cross drilling as a second operation.

The illustration shows a part that has three holes drilled simultaneously. This is accomplished by picking up the piece, as it is cut off the bar, with the transfer arm and transporting it to a



both types!

the lacing you like in more convenient form!

WIREGRIP BELT HOOKS fit all standard lacers, come in 6 sizes with blue aligning cards that hold hooks in perfect alignment, prevent waste of card ends, speed up lacing and assure a perfectly aligned job. Only **WIREGRIP** has the blue card.

STEELGRIP comes in 8 sizes in handy boxes or long lengths, with 2-piece hinged rocker pins that add flexibility and take the wear. It penetrates the toughest belt easily, clinches

so securely. Makes a permanent "humpless" joint. Recommended for conveyor belts and heavy drives—especially drives operating under outdoor conditions. Long lengths to 72 inches in stock.

CHAIN GRIP WHEEL PULLERS pull gears, pulleys, wheels, pinions, sheaves... regardless of distance from end of shaft. Has special hooks for motor pulleys and bushings, 2 sizes, 3 ton and 12 ton.



WIREGRIP LACERS Improved vise Type or Standard Bench Types (parts interchangeable with other makes.)

Write for catalog

ARMSTRONG-BRAY & CO.

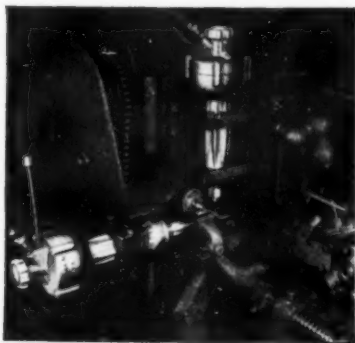
"THE BELT LACING PEOPLE"

315 N. Loomis St.

Chicago, U. S. A.

drill jig mounted on the body of the special main bracket.

The Power Kipps in the vertical and back positions are mounted on slides carried on the special bracket and actu-



ated by a cam which is driven by a roller chain, which in turn is connected to the cam shaft of the machine

by pinion gears. Actual drilling time for the $\frac{1}{8}$ -in., and No. 60 holes, with feeds as shown, is 1.26 of a second. Drills recede and again move forward alternately to remove burrs in .22 of a second.

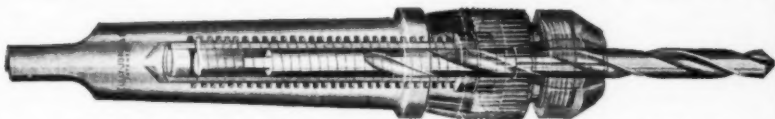
The third Power Kipp, shown on the left hand side, for drilling the $\frac{5}{64}$ -in. hole is held in a bracket mounted on the cross slide of the machine. As the next piece is being formed, the same forward movement of the slide motivates the air grinder and the actual drilling time for this hole is .45 of a second.

Regular shop air pressure of 60 to 80 pounds is used and filtered through a 150 mesh strainer.

The stand pipe shown at inlet connection is used to lubricate bearings. When lubricating the spindle, the air supply is closed and the tube filled with oil, after which the cap is screwed on the end of the tube and the air turned on. A short time elapses before the air motor will run smoothly due to the excess oil in the ports. This procedure is followed about twice a day. A

Announcing!

FEED AS YOU NEED CHUCK



A drill can be held within the body of the FEED AS YOU NEED chuck and fed out by means of a screw arrangement. This drawing and repelling action of the chuck permits the operator to have only the amount of drill projecting that is necessary to go through the work and drill bushing.

Breakage of drills is eliminated with this new method of holding and driving drills, because of a shorter grip.

Complete information regarding this new chuck can be secured from the following agents:

L. C. Bigelow & Company, New York City

Camm Blades Mch. Company, Milwaukee

E. T. Oliver, Cleveland

Gross & Heming, Detroit

E. A. Kinsey Company, Indianapolis

—SCULLY-JONES AND COMPANY—

1901 S. Rockwell Street,

Chicago, Illinois

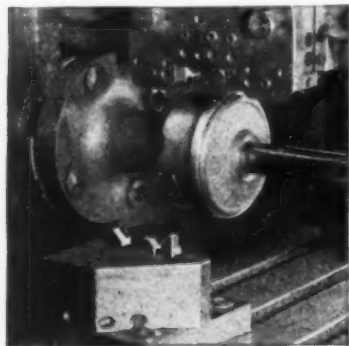
shield, not shown, is snapped onto the end of the body to prevent the cutting oil or coolant from being blown away from the work while machining.

As the drilling is done simultaneously with the machining, no extra time is required and the gross production on this job is 800 pieces per hour.

For further information, please address Madison-Kipp Corp., Madison, Wis. We'll appreciate mention of The BLUE BOOK.

6% Dividend Every 48 Minutes

Carboloy Co., Inc., offer this interesting case history. Seven Carboloy cemented carbide tools are asserted to face four surfaces and chamfer three surfaces on a cast iron part at the rate of over 300 pieces per hour. These tools are ground once a week—every

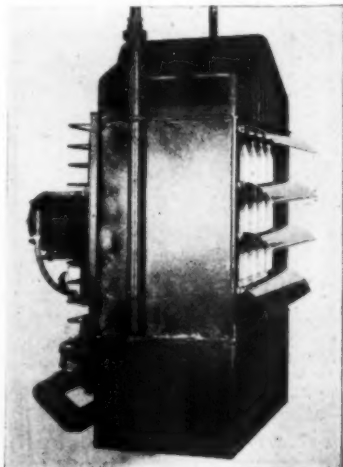


25,000 pieces. This mid-western manufacturer has figured that the \$30.39 worth of tools paid for themselves in 13½ hours and are paying a 6% dividend every 48 minutes. By the time the tools wear out, it is estimated that over \$9,000.00 will have been saved in tool costs, grinding costs, down time costs, and machining costs.

Pittsburgh Gas Unit Heater

A new gas-fired unit heater, operating without steam or water and completely self-contained, has been added

to the line of heating units manufactured by the Automatic Gas Steam Radiator Co., 448 Brushton Ave., Pittsburgh, Pa.



The unit is suspended from the ceiling, out of the way, and employs natural or manufactured gas for fuel. In addition to heating, it may be adapted for other purposes such as ventilating, cooling and drying. It is available in five sizes ranging in capacity from 85,000 to 200,000 b.t.u., per hour.

Operation and construction of the new heater is quite simple. The gas fires into a combustion chamber, the products of combustion being passed upward through a bank of tubes and out at the rear of the housing. Air is passed around these tubes by a motor-driven fan located on the back of the unit. The assembly includes a safety pilot which turns off the gas if the pilot goes out or burns too low to insure ignition.

The manufacturer has prepared instructive new literature and will gladly furnish complete information on request. Ask for Folder No. 552, and please mention The BLUE BOOK.

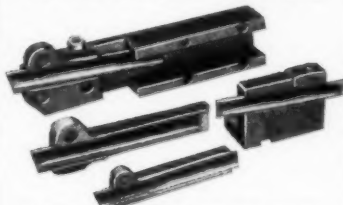
Veteran Firm Issues Revised Steel Handbook

The Philadelphia firm of Horace T. Potts Co., warehouse distributors of steel and supplies, recently issued the 21st edition of their familiar Steel Handbook. Considerable space is devoted to the stainless and alloy steels, so rapidly being adopted by industry. Steel users have always welcomed this publication because of the wealth of technical data it contains relating to forms and types of steels and the uses to which they may be applied.

Triplex Adds Rivet Department

The Triplex Screw Co., Cleveland, Ohio, makers of cap and set screws, bolts and nuts, announce the addition of a rivet department. The new division of this 20-year old concern will shortly be in position to manufacture round, cone, flat and countersunk rivets. Triplex is now producing coopers' and tinner's rivets.

"MASTER TOOLS"



A NEW FEATURE IN CUT-OFF TOOLS

Master Cut-off Blades, either flat or with radius on top.	Thick- ness	Width	Price Each
<i>We will furnish any size not listed on request.</i>	1 3/2	1 1/2	.90
	3 6/4	1 1/2	.85
	1 1/6	1 1/2	.85
	3 3/2	1 1/2	.90
Standard blades are made from 18-4-1	3 3/2	5 8	1.00
	1 8	5 8	1.00
High Speed Steel,		23 3/2	1.10
but we also carry in	9 6/4	23 3/2	1.35
stock all sizes of	5 3/2	23 3/2	1.40
blades, made from	3 1/6	27 3/2	1.60
18-4-2 High Speed	3 1/6	31 3/2	1.70
Steel and Cobalt.	7 3/2	31 3/2	1.80
Write for full details.	1 1/4	31 3/2	1.90

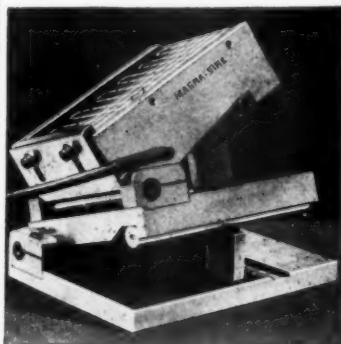
MASTER TOOL, INC.,
3300 Hubbard Avenue, Detroit

MAGNA-SINE

(TRADE MARK REGISTERED)

MAGNETIC SINE TABLE

for holding work at any angle, single or compound, for grinding, checking, etc.



Saves hours in setting up.

Fine-limit accuracy on grinding operations.

No screws or nuts to tighten or slacken.

No clamps and no distortion of delicate work.

● Ask for our trial offer

OMER E. ROBBINS COMPANY

635 Mt. Elliott Ave., Detroit, Mich.

Buyers' Directory

Abrasive Cut-off Machines

Challenge Mchy. Co., Grand Haven, Mich.
Tannewitz Works, Grand Rapids, Mich.

Adapters, Adjustable

Glenzer Company, J. C., Detroit, Mich.

Angle Iron Cutting & Notching Machines

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Arbors

Kearney & Trecker Corp., Milwaukee, Wis.

Balancing Ways

Anderson Bros. Mfg. Co., Rockford, Ill.
Sundstrand Machine Tool Co., Rockford, Ill.

Baling Presses

Galland-Henning Mfg. Co., Milwaukee, Wis.

Band Saw Machines, for Metal

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Delta Mfg. Co., Milwaukee, Wis.
Grob Bros., Grafton, Wis.
Oliver Machinery Co., Grand Rapids, Mich.
Tannewitz Works, Grand Rapids, Mich.
Wells Mfg. Co., Three Rivers, Mich.

Bar Cutters

Buffalo Forge Company, Buffalo, N. Y.

Belt Lacing

Armstrong-Bray & Co., 315 N. Loomis, Chicago

Belt Sanders

Skilsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Belta, V-Type

Delta Mfg. Co., Milwaukee, Wis.

Bench Legs, Steel

Standard Pressed Steel Co., Jenkintown, Pa.

Bending Machines, Hand and Power

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Buffalo Forge Company, Buffalo, N. Y.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Bending Rolls

Buffalo Forge Co., Buffalo, N. Y.
Marshalltown Mfg. Co., Marshalltown, Ia.
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Bins

Interior Steel Equipment Co., Cleveland, O.
Stackbin Corp., Providence, R. I.

Blower Wheels (Sirocco Type)

Janette Mfg. Co., 556 W. Monroe St., Chicago

Blowers, Portable Electric

Buffalo Forge Company, Buffalo, N. Y.
Clements Mfg. Co., 6650 Naragansett, Chicago
General Blower Co., 401 N. Peoria St., Chicago
Skilsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Bolts and Nuts

Triplex Screw Co., Cleveland, Ohio

Books, Engineering and Technical

Lincoln Electric Co., Cleveland, Ohio
Starrett Co., L. S., Athol, Mass.

Boring Bars

F. A. Maxwell Co., Bedford, Ohio
Rigid Tool Holder Co., Detroit, Mich.
Russell Boring Bar Co., Middletown, Ohio

Boring Heads

Flynn Manufacturing Co., Detroit, Mich.

Boring Machines

Cleerman Machine Tool, Green Bay, Wis.
Ex-Cell-O Corp., Detroit, Mich.
R & L Tools, Philadelphia, Pa.

Brakes, Hand and Power

Dreis & Krump Mfg. Co., 7440 So. Loomis Blvd., Chicago, Ill.
Vernon Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Brazers, Electric

Grob Brothers, Grafton, Wis.
Oliver Machinery Co., Grand Rapids, Mich.

Broaching Machine Tools

Colonial Branch Co., Detroit, Mich.

Broach Sharpening Machines

Colonial Branch Co., Detroit, Mich.

Broaches, Adjustable Clamp

East Shore Machine Products Co., Cleveland, O.

Broaches, Spline and Square

Colonial Bushings Co., Detroit, Mich.
Ex-Cell-O Corp., Detroit, Mich.
Taylor Machine Co., Cleveland, Ohio

Buffers, Bench

Hammond Machinery Builders, Kalamazoo, Mich.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Vonnegut Moulder Corp., Indianapolis, Ind.

Buffers, Pedestal

Vonnegut Moulder Corp., Indianapolis, Ind.

Bushings, Jig

Acme Industrial Co., 210 N. Laflin St., Chicago
Colonial Bushings Co., Detroit, Mich.
Ex-Cell-O Corp., Detroit, Mich.

Bushings, Steel

Acme Industrial Co., 210 N. Laflin St., Chicago
Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.

Cable, Welding

Lincoln Electric Co., Cleveland, Ohio

Calipers

Comet Tools, Inc., 39 Union Square, New York
Scherr Co., George, 122 Lafayette St., N. York

Cams, Alloy Steel

Modern Collet & Machine Co., Ecorse, Mich.

Cap Screws

Triplex Screw Co., Cleveland, Ohio

Center Points

Ford Motor Co., Johansson Div., Dearborn, Mich.

Centering Machines

Cullman Wheel Co., 1359 Altgeld St., Chicago
Sundstrand Machine Tool Co., Rockford, Ill.

Centers, Lathe

Modern Machine Corp., Brooklyn, N. Y.
Motor Tool Mfg. Co., Detroit, Mich.
Nielsen, Inc., Lawton, Mich.
Rigid Tool Holder Co., Detroit, Mich.

Chains, Silent and Roller

Chicago Gear Works, 769 W. Jackson Blvd., Chicago, Ill.
Cullman Wheel Co., 1359 Altgeld St., Chicago

Chamfering Machines, Automatic

Grant Mfg. & Machine Co., Bridgeport, Conn.

Chucking Fingers

Modern Collet & Machine Co., Ecorse, Mich.
Morrison Machine Products Div., Elmira, N. Y.

Buyers' Directory

Chucks, Air

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.
Tomkins-Johnson Co., Jackson, Mich.

Chucks, Automatic

Proconer Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.

Chucks, Collet

Cushman Chuck Company, Hartford, Conn.
Hardinge Brothers, Inc., Elmira, N. Y.
Proconer Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.

Chucks, Combination

Cushman Chuck Company, Hartford, Conn.

Chucks, Drill and Tap

Errington Mech. Labor., Staten Island, N. Y.
Etico Tool Co., 594 Johnson Ave., Brooklyn, N. Y.
Hartford Special Mach'y Co., Hartford, Conn.
Nielsen, Inc., Lawton, Mich.
Proconer Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.
Sampson Tool Co., 101 Walker St., New York
Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Chucks, Geared Scroll

Cushman Chuck Company, Hartford, Conn.

Chucks, Lathe

Cushman Chuck Company, Hartford, Conn.
L-W Chuck Co., Toledo, Ohio
Sampson Tool Co., 101 Walker St., New York

Chucks, Magnetic

Brown & Sharpe Mfg. Co., Providence, R. I.

Chucks, Quick Change

Glenzer Company, J. C., Detroit, Mich.
Jarvis Co., Chas. L., Middletown, Conn.
Proconer Safety Chuck Co., 14 So. Clinton St., Chicago, Ill.

Clamping Devices, Air Operated

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Clutches, Friction

Conway Clutch Co., Cincinnati, Ohio

Coil Winding Equipment

Ideal Commutator Dresser Co., Sycamore, Ill.

Collets and Feed Finders

Modern Collet & Machine Co., Ecorse, Mich.
Morrison Machine Products Div., Elmira, N. Y.

Collets for all Lathes and Millers

Hardinge Brothers, Inc., Elmira, N. Y.
Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Co., Detroit, Mich.

Collets, Quick Change

Jarvis Co., Chas. L., Middletown, Conn.

Collet Tubes

Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Co., Detroit, Mich.

Comparators

Federal Products Corp., Providence, R. I.

Contract Work Wanted

Burke Machine Tool Co., Conneaut, Ohio

Counterbores

Ex-Cell-O Corp., Detroit, Mich.
Glenzer Company, J. C., Detroit, Mich.
Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Countersinks

Glenzer Company, J. C., Detroit, Mich.
Severance Tool Mfg. Co., Saginaw, Mich.

Couplings, Belt

Armstrong-Bray & Co., 315 N. Loomis, Chicago

Couplings, Compression Shaft

W. H. Nicholson & Co., Wilkes-Barre, Pa.

Couplings, Flexible

Lovejoy Flex. Coupling Co., 5026 Lake, Chicago
W. H. Nicholson & Co., Wilkes-Barre, Pa.

Couplings, Friction Clutch

Conway Clutch Co., Cincinnati, Ohio

Couplings, Shaft

W. H. Nicholson & Co., Wilkes-Barre, Pa.

Cut-Off Machines

Modern Machine Tool Co., Jackson, Mich.

Cut-off Saws

Oliver Machinery Co., Grand Rapids, Mich.
Tannewitz Works, Grand Rapids, Mich.

Cutter Grinders

Gorton Machine Co., Geo., Racine, Wis.
Oliver Instrument Co., Adrian, Mich.

Cutters

Progressive Tool & Cutter Co., Ferndale, Mich.
Putnam Tool Co., Detroit, Mich.
Tomkins-Johnson Co., Jackson, Mich.

Cutters, Ball Socket

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Midget Milling

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Milling

Brown & Sharpe Mfg. Co., Providence, R. I.
Ex-Cell-O Corp., Detroit, Mich.
Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.

Modern Machine Tool Co., Jackson, Mich.

Renn Tool Company, Detroit, Mich.

Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Willey's Carbide Tool Co., Detroit, Mich.

Cutters, Gear

Michigan Tool Co., Detroit, Mich.

Cutters, Taper Reaming

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Tube Burring

Severance Tool Mfg. Co., Saginaw, Mich.

Cutters, Woodruff

Glenzer Company, J. C., Detroit, Mich.

Cylinders, Air

Hanna Engineering Works, 1703 Elston, Chicago
Hannifin Mfg. Co., 621 S. Kolmar, Chicago
Tomkins-Johnson Co., Jackson, Mich.

Demagnetizers

Alfco Manufacturing Company, Grand Rapids, Mich.

Electro-Matic Products Co., 4820 Deming Place, Chicago, Ill.

Luma Electric Equipment Co., Toledo, Ohio

L-W Chuck Co., Toledo, Ohio

Printz Electric Co., Detroit, Mich.

Victor Machinery Co., 130 S. Clinton St., Chicago, Ill.

Die Cushions

Dayton Rogers Mfg. Co., Minneapolis, Minn.

Die Duplicating Machines

Gorton Machine Co., Geo., Racine, Wis.

Die Filers

Continental Machine Specialties, Minneapolis
Grob Brothers, Grafton, Wis.

Jarvis Co., Charles L., Middletown, Conn.

Oliver Instrument Co., Adrian, Mich.

Die Making Machines

Armco Co., Milwaukee, Wis.
Continental Machine Specialties, Minneapolis
Grob Brothers, Grafton, Wis.
Harvey Mfg. Co., 103 Grand St., New York
Oliver Instrument Co., Adrian, Mich.
Pratt & Whitney, Hartford, Conn.

Die Makers' Supplies

Cerro de Pasco Copper Corp., 44 Wall St., New York, N. Y.
Dayton Rogers Mfg. Co., Minneapolis, Minn.

Die Sets

Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave. Chicago, Ill.

Buyers' Directory

- Dies, Blank and Forming**
American Tool Works, Inc., Hartford, Conn.
Hamilton Tool Company, Hamilton, Ohio
Hovis Screwlock Co., Detroit, Mich.
- Dies, Hole Punching**
Strippit Corp., Buffalo, N. Y.
- Dies, Notching**
Strippit Corp., Buffalo, N. Y.
- Dividing Heads**
Wm. Carroll & Son, Norwood, Cincinnati, O.
L-W Chuck Co., Toledo, Ohio
- Dowel Pins, Steel**
Acme Industrial Co., 210 N. Laflin St., Chicago
Baumbach Mfg. Co., E. A., 1812 So. Kilbourne Ave., Chicago, Ill.
- Draftsmen's Tables**
Hamilton Mfg. Co., Two Rivers, Wis.
- Dressers**
Oliver Motorcraft Co., 2532 S. Wabash, Chicago
- Dressing Tools**
Willey's Carbide Tool Co., Detroit, Mich.
- Drill Bushings**
Acme Industrial Co., 210 N. Laflin St., Chicago
- Drills, Core**
Glenzer Company, J. C., Detroit, Mich.
- Drills, Electric**
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.
- Drill Grinders**
Black Diamond Saw & Machine Works, Inc., Natick, Mass.
Gallmeyer & Livingston Co., Gr. Rapids, Mich.
Oliver Instrument Co., Adrian, Mich.
- Drill Presses**
Walker-Turner Company, Plainfield, N. J.
- Drill Press Heads**
Walker-Turner Company, Plainfield, N. J.
- Drilling Attachments, High Speed**
Dairne Tools Company, Syracuse, N. Y.
- Drilling Machines, Bench**
Ayer Manufacturing Co., F. H., Chicago Heights, Ill.
Atlas Press Co., Kalamazoo, Mich.
Buffalo Forge Company, Buffalo, N. Y.
Burke Machine Tool Co., Conneaut, Ohio
Cleereman Machine Tool Co., Green Bay, Wis.
Delta Mfg. Co., Milwaukee, Wis.
- Drilling Machines, Fully Geared**
Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago, Ill.
Cleereman Machine Tool Co., Green Bay, Wis.
- Drilling Machines, Multiple Spindle**
Buffalo Forge Co., Buffalo, N. Y.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
- Drilling Machines, Portable Electric**
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.
Strand Co., N. A., 5001 N. Wolcott St., Chicago
- Drilling Machines, Post**
Buffalo Forge Co., Buffalo, N. Y.
- Drilling Machines, Sensitive**
Atlas Press Co., Kalamazoo, Mich.
Buffalo Forge Company, Buffalo, N. Y.
Burke Machine Tool Co., Conneaut, Ohio
Hamilton Tool Co., Hamilton, Ohio
- Drilling Machines, Upright**
Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago, Ill.
Cleereman Machine Tool Co., Green Bay, Wis.
- Drilling Machines, Vertical**
Atlas Press Co., Kalamazoo, Mich.
Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago, Ill.
Buffalo Forge Company, Buffalo, N. Y.
Cleereman Machine Tool Co., Green Bay, Wis.
- Drilling Machines, Wall Type**
Ayer Manufacturing Co., F. H., Chicago Heights, Ill.
- Drives, Lathe**
Berkeley Engineering Co., Cleveland, Ohio
Blackstone Tool & Manufact. Co., Detroit, Mich.
Cullman Wheel Co., 1359 Altgeld St., Chicago
Hardinge Brothers, Inc., Elmira, N. Y.
Powermaster, 25 E. Fourth St., New York, N. Y.
Remco Products Corp., 110 S. Dearborn St., Chicago, Ill.
- Drives, Machine Tool**
Blackstone Tool & Manufact. Co., Detroit, Mich.
- Drives, Shaper**
Blackstone Tool & Manufact. Co., Detroit, Mich.
- Drives, Variable Speed**
Columbia Vari-Speed Company, Wheaton, Ill.
- Elevating Tables**
Hamilton Tool Company, Hamilton, Ohio
- Emery Wheel Dressers and Cutters**
Oliver Motorcraft Co., 2532 S. Wabash, Chicago
Western Tool & Mfg. Co., Springfield, Ohio
- End Mills**
Glenzer Company, J. C., Detroit, Mich.
Progressive Tool & Cutter Co., Ferndale, Mich.
Putnam Tool Co., Detroit, Mich.
Willey's Carbide Tool Co., Detroit, Mich.
- Engraving Machines**
Gorton Machine Co., Geo., Racine, Wis.
- Etching Machines, Electric**
Brewster Co., Inc., 50 Church St., New York, N. Y.
- Ideal Commutator Dresser Co., Sycamore, Ill.**
Luna Electric Equipment Co., Toledo, Ohio
Frintz Electric Co., Detroit, Mich.
- Exhaust Blowers**
Buffalo Forge Company, Buffalo, N. Y.
- Experimental Work**
American Tool Works, Inc., Hartford, Conn.
- Extractors, Tap**
Walton Co., Hartford, Conn.
- Facers, Spot**
Glenzer Company, J. C., Detroit, Mich.
- Feed Fingers for Auto. Screw Machines**
Modern Collet & Machine Co., Ecorse, Mich.
Morrison Machine Products Div., Elmira, N. Y.
Sutton Tool Co., Detroit, Mich.
- Files**
Oliver Instrument Co., Adrian, Mich.
- Files, Rotary**
Ford Mfg. Co., M. A., Davenport, Iowa
Grobet File Corp. of America, 3 Park Place, New York, N. Y.
Hamilton Tool Co., Hamilton, Ohio
Jarvis Co., Charles L., Middletown, Conn.
Pratt & Whitney Div., Hartford, Conn.
Severance Tool Mfg. Co., Saginaw, Mich.
- Filing Machines**
Continental Machine Specialties, Minneapolis
Grob Brothers, Grafton, Wis.
Harvey Mfg. Co., 161 Grand St., New York
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Oliver Instrument Co., Adrian, Mich.
- Filing Room Equipment**
Wardwell Manufacturing Co., Cleveland, Ohio
- Flaners, Hand and Power**
Ward Machine Co., 564 W. Washington, Chicago, Ill.
- Flexible Couplings**
Lovejoy Flexible Coupling Co., 5026 Lake, Chgo.
- Flexible Shafts and Accessories**
American Rotary Tools Co., 44 Whitehall St., New York, N. Y.
Haskins Company, R. G., 623 S. California Ave., Chicago, Ill.
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago
Stow Manufacturing Company, Binghamton, N. Y.
Strand & Co., 5001 N. Wolcott, Chicago
Walker-Turner Company, Plainfield, N. J.
Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Buyers' Directory

Flexible Shaft Couplings

Lovejoy Flexible Coupling Co., 5026 Lake, Chgo.
W. H. Nicholson & Co., Wilkes-Barre, Pa.

Flexible Shaft Machinery

Haskins Company, R. G., 623 S. California Ave., Chicago, Ill.
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago
Pratt & Whitney, Hartford, Conn.
Stow Manufacturing Company, Binghamton, N. Y.
Strand & Co., 5001 N. Wolcott, Chicago
Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Floating Holders

Glenzer Company, J. C., Detroit, Mich.

Flue Lathes

Marshalltown Mfg. Co., Marshalltown, Ia.

Flue Welders

Marshalltown Mfg. Co., Marshalltown, Ia.

Forming Tools

Michigan Tool Co., Detroit, Mich.
Morrison Machine Products Div., Elmira, N. Y.

Furniture, Machine Shop

Standard Pressed Steel Co., Jenkintown, Pa.
Western Tool & Mfg. Co., Springfield, Ohio

Gages

Federal Products Corp., Providence, R. I.
Ford Motor Co., Johanson Div., Dearborn, Mich.
Willey's Carbide Tool Co., Detroit, Mich.

Gages, Pla, Plug, Ring and Snap

American Tool Works, Inc., Hartford, Conn.
Standard Gage Co., Poughkeepsie, N. Y.

Gages, Pressure

Marshalltown Mfg. Co., Marshalltown, Ia.

Gages, Special

Federal Products Corp., Providence, R. I.
Ford Motor Co., Johanson Div., Dearborn, Mich.
Standard Gage Co., Poughkeepsie, N. Y.
Starrett Co., L. S., Athol, Mass.

Gages, Taper

Hartford Special Machinery Co., Hartford, Conn.

Gage Blocks, Precision

Ford Motor Co., Johanson Div., Dearborn, Mich.

Gasoline Electric Light Plants

Janette Mfg. Co., 556 W. Monroe St., Chicago

Gears

Abart Gear & Mch. Co., 4832 W. 16th St., Chgo.
Atlantic Gear Works, 200 Lafayette St., New York, N. Y.

Chicago Gear Works, 700 W. Jackson Blvd., Chicago, Ill.

Taylor Machine Co., Cleveland, Ohio

Gear Pumps

East Shore Machine Products Company, Cleveland, Ohio

Generators

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
Janette Mfg. Co., 552 W. Monroe St., Chicago

Goggles

Sellstrom Mfg. Co., 646 N. Aberdeen St., Chicago, Ill.

Grinder Live Centers

Motor Tool Mfg. Co., Detroit, Mich.

Grinders, Air

M-B Products, Detroit, Mich.

Grinders, Bench

Baldor Electric Co., St. Louis, Mo.
Hammond Machinery Builders, Kalamazoo, Mich.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.
Vonnegut Moulder Corp., Indianapolis, Ind.
Walker-Turner Company, Plainfield, N. J.

Grinders, Disc

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Oliver Machinery Co., Grand Rapids, Mich.
Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Grinders, External

F. A. Maxwell Co., Bedford, Ohio

Grinders, Flexible Shaft

Haskins Company, R. G., 623 S. California Ave., Chicago, Ill.

Jarvis Co., Charles L., Middletown, Conn.

Mall Tool Co., 7742 S. Chicago Ave., Chicago
Stanley Electric Tool Div., New Britain, Conn.
Stow Manufacturing Company, Binghamton, N. Y.
N. A. Strand & Co., 5001 N. Wolcott, Chicago

Grinders, Hand

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Duro Metal Products Co., 2651 N. Kildare Ave., Chicago, Ill.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
M-B Products Co., Detroit, Mich.

Skillsaw, Inc., 3304 Elston Ave., Chicago, Ill.

Grinders, Heavy Duty

Vonnegut Moulder Corp., Indianapolis, Ind.

Grinders, High Speed

Bridgeport Pattern & Model Works, Bridgeport, Conn.

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Jarvis Co., Charles L., Middletown, Conn.

Mall Tool Co., 7742 S. Chicago Ave., Chicago
M-B Products, Detroit, Mich.

Grinders, Internal

F. A. Maxwell Co., Bedford, Ohio

Grinders, Pedestal Electric

Baldor Electric Co., St. Louis, Mo.
Hammond Machinery Builders, Kalamazoo, Mich.

Grinders, Swing Frame

Vonnegut Moulder Corp., Indianapolis, Ind.

Grinders, Valve

F. A. Maxwell Co., Bedford, Ohio

Grinders and Polishers, Belt

Oliver Machinery Co., Grand Rapids, Mich.

Grinding Attachments, Drill

Atlas Press Co., Kalamazoo, Mich.
Carlson Mfg. Co., C. H., Minneapolis, Minn.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Oliver Instrument Co., Adrian, Mich.

Grinding, Centerless (Contract)

Ertel Machine Co., Indianapolis, Ind.
Helin Company, Fairfield, Conn.
Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.

Grinding Machines, Belt

Armigo Co., Milwaukee, Wis.
Walls Sales Corp., 96 Warren St., New York

Grinding Machines, Cutter, Reamer and Tool

Brown & Sharpe Mfg. Co., Providence, R. I.
Gallmeyer & Livingston Co., Grand Rapids, Mich.

Hammond Machinery Builders, Kalamazoo, Mich.

National Machine Tool Co., Racine, Wis.

Oliver Instrument Co., Adrian, Mich.

Prosser & Son, 120 Wall St., New York, N. Y.

Rogers & Co., Buffalo, N. Y.

Grinding Machines, Internal

National Machine Tool Co., Racine, Wis.

Grinding Machines, Portable Electric

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Duro Metal Products Co., 2651 N. Kildare Ave., Chicago, Ill.

Haskins Company, R. G., 623 S. California Ave., Chicago, Ill.

Jarvis Co., Charles L., Middletown, Conn.

Mall Tool Co., 7742 S. Chicago Ave., Chicago
National Machine Tool Co., Racine, Wis.

Pratt & Whitney, Hartford, Conn.
Stow Manufacturing Company, Binghamton, N. Y.

Strand Co., N. A., 5001 N. Wolcott St., Chicago

Grinding Machines, Surface

Gallmeyer & Livingston Co., Grand Rapids, Mich.

Buyers' Directory

Grinding Machines, Tap

Gallmeyer & Livingston Co., Grand Rapids, Mich.
Oliver Instrument Co., Adrian, Mich.

Grinding Machines, Tool

Prosser & Son, 120 Wall St., New York, N. Y.
Rogers & Co., Buffalo, N. Y.

Grinding Service

Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.

Grinding Spindles

Ex-Cell-O Corp., Detroit, Mich.

Grinding Wheels

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Hack Saw Blades

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Starrett Co., L. S., Athol, Mass.

Hack Saw Machines

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
L-W Chuck Co., Toledo, Ohio
Wells Mfg. Corp., Three Rivers, Mich.

Hammers, Portable Electric

Stanley Electric Tool Div., New Britain, Conn.

Hand Saws, Portable Electric

SkilSaw, Inc., 3304 Elston Ave., Chicago, Ill.

Hand Screw Machine Live Centers

Motor Tool Mfg. Co., Detroit, Mich.

Hand Screw Machines, Precision

Hardinge Brothers, Inc., Elmira, N. Y.

Heads, Boring

Flynn Manufacturing Co., Detroit, Mich.

Hobs

Michigan Tool Co., Detroit, Mich.

Hole Cutters

Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Index Centers

Brown & Sharpe Mfg. Co., Providence, R. I.
Win. Carroll & Son, Norwood, Cincinnati, Ohio
L-W Chuck Co., Toledo, Ohio

Index Fixtures

Tree Tool & Die Works, Racine, Wis.

Indicators, Dial

Federal Products Corp., Providence, R. I.
Standard Gage Co., Inc., Poughkeepsie, N. Y.
Starrett Co., L. S., Athol, Mass.

Indicators, Speed

Starrett Co., L. S., Athol, Mass.

Indicators, Surface Test

Federal Products Corp., Providence, R. I.
Reich Mfg. Co., J. E., Dayton, Ohio
Starrett Co., L. S., Athol, Mass.

Big Bore

Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago, Ill.
Cleereman Machine Tool Co., Green Bay, Wis.

Jigs and Fixtures

American Tool Works, Inc., Hartford, Conn.
Hamilton Tool Company, Hamilton, Ohio
Hartford Special Machinery Co., Hartford, Conn.

Keyseating Machines

Burr & Son, John T., Brooklyn, N. Y.

Knife Grinders

Rogers & Co., Buffalo, N. Y.

Lathe Centers

Nielsen, Inc., Lawton, Mich.

Lathe Live Centers

Modern Machine Corp., Brooklyn, N. Y.
Motor Tool Mfg. Co., Detroit, Mich.
Rigid Tool Holder Co., Detroit, Mich.

Lathe Drives

Cullman Wheel Co., 1359 Altgeld St., Chicago
Hardinge Brothers, Inc., Elmira, N. Y.

Lathes, Back Geared

Atlas Press Co., Kalamazoo, Mich.
Rivett Lathe & Grinder, Inc., Brighton, Boston
South Bend Lathe Works, South Bend, Ind.

Lathes, Bench

Atlas Press Co., Kalamazoo, Mich.
Delta Mfg. Co., Milwaukee, Wis.
Hardinge Brothers, Inc., Elmira, N. Y.
Rivett Lathe & Grinder, Inc., Brighton, Boston
South Bend Lathe Works, South Bend, Ind.

Lathes, Manufacturing

Sundstrand Machine Tool Co., Rockford, Ill.

Lathes, Polishing & Buffing

Hammond Machinery Builders, Kalamazoo, Mich.
Hardinge Brothers, Inc., Elmira, N. Y.

Lathes, Precision Bench

Stark Tool Company, Waltham, Mass.

Lathes, Screw Cutting

Atlas Press Co., Kalamazoo, Mich.
Hardinge Brothers, Inc., Elmira, N. Y.
South Bend Lathe Works, South Bend, Ind.

Lathes, Speed

Schauer Machine Co., Cincinnati, Ohio

Lathes, Toolroom

Atlas Press Co., Kalamazoo, Mich.
Hardinge Brothers, Inc., Elmira, N. Y.
South Bend Lathe Works, South Bend, Ind.

Layout Fluid

Dayton Rogers Mfg. Co., Minneapolis, Minn.
Michigan Chrome Company, Detroit, Mich.

Layout Plates

Challenge Machinery Co., Grand Haven, Mich.

Leader Pins, Steel

Aene Industrial Co., 210 Laflin St., Chicago, Ill.

Leather Oil Retainers

Gits Bros. Mfg. Co., 1809 S. Kilbourn, Chicago

Lift Jacks

All Steel Welded Truck Corp., Rockford, Ill.

Live Lathe Centers

Glenzer Company, J. C., Detroit, Mich.
Modern Machine Corp., Brooklyn, N. Y.
Motor Tool Mfg. Co., Detroit, Mich.

Live Skids

All Steel Welded Truck Corp., Rockford, Ill.

Lock Forming Machines, Power

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Lubricators, Air

Norgren, C. A., Denver, Colorado

Lubricators, Automatic

M-B Products Co., Detroit, Mich.
Norgren Co., C. A., Denver, Colorado

Magnetic Chuck Demagnetizers

Electro-Matic Products Co., 4820 Deming Place, Chicago, Ill.

Mandrels, Expanding

W. H. Nicholson & Co., Wilkes-Barre, Pa.
Western Tool & Mfg. Co., Springfield, Ohio

Marking Machines

Ideal Commutator Dresser Co., Sycamore, Ill.
Schmidt, Geo. T., Inc., 1802 Belle Plaine Ave., Chicago, Ill.

Buyers' Directory

Milling Attachments

Bridgeport Pattern & Model Works, Bridgeport, Conn.

Burke Machine Tool Co., Conneaut, Ohio
Wm. Carroll & Son, Norwood, Cincinnati, Ohio
Dalrae Tools Company, Syracuse, N. Y.
Kearney & Trecker Corp., Milwaukee, Wis.

Milling Machine Live Centers

Motor Tool Mfg. Co., Detroit, Mich.

Milling Machines, Bench

Burke Machine Tool Co., Conneaut, Ohio
Hardinge Brothers, Inc., Elmira, N. Y.
Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Hand

Burke Machine Tool Co., Conneaut, Ohio
Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Plain

Burke Machine Tool Co., Conneaut, Ohio
Kearney & Trecker Corp., Milwaukee, Wis.
Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines, Universal

Brown & Sharpe Mfg. Co., Providence, R. I.
Gorton Machine Co., Geo., Racine, Wis.
Kearney & Trecker Corp., Milwaukee, Wis.

Milling Machines, Vertical

Blank Machinery, Jackson, Mich.
Gorton Machine Co., Geo., Racine, Wis.
Kearney & Trecker Corp., Milwaukee, Wis.

Motors

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
Janette Mfg. Co., 552 W. Monroe St., Chicago

Motor-Generator Sets

Chicago Electric Co., 1330 W. Cermak Rd., Chgo.
Janette Mfg. Co., 552 W. Monroe St., Chicago

Motor Drives, Universal

Berkeley Engineering Co., Cleveland, Ohio
Cullman Wheel Co., 1339 Altgeld St., Chicago
Powermaster, 25 E. Fourth St., New York, N. Y.
Remco Products Corp., 110 S. Dearborn St., Chicago, Ill.
Steege Machinery Co., 548 W. Monroe St., Chicago, Ill.
Turner Uni-Drive Co., Kansas City, Mo.

Motor Starters

Lincoln Electric Co., Cleveland, Ohio

Moulds & Laddies, Hammer and Vise

Johnson Tool Co., East Providence, R. I.

Multiple Oilers

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Nails

Hussal, John, Inc., Brooklyn, N. Y.

Nibbling Machines

National Machine Tool Co., Racine, Wis.

Oil Cups

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Oil Gauges

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Oil and Grease Seals

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

Parallels

Ford Motor Co., Johanson Div., Dearborn, Mich.

Pins, Leader and Dowel

Acme Industrial Co., 210 Laflin St., Chicago, Ill.
Baumbach Mfg. Co., E. A., 1812 So. Kilbourn Ave., Chicago, Ill.

Pipe Cutters

Ridge Tool Co., Elyria, Ohio

Pipe Vises

Ridge Tool Co., Elyria, Ohio

Pipe Wrenches

Ridge Tool Co., Elyria, Ohio

Plates, Surface and Bench

Master Tapper Company, Belleville, N. J.

Point Thinning Machines

Oliver Instrument Co., Adrian, Mich.

Press Brakes

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.
Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Press Feeds

Littell Machine Co., F. J., 4153 Ravenswood Ave., Chicago, Ill.
Wittek Mfg. Co., 4300 W. 24th Place, Chicago

Presses, Arbor

Atlas Press Co., Kalamazoo, Mich.
Fanco Machine Co., Racine, Wis.
Greenerd Arbor Press Co., Nashua, N. H.
Hanna Engineering Works, 1763 Elston, Chicago
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.
W. H. Nicholson & Co., Wilkes-Barre, Pa.
Tomkins-Johnson Co., Jackson, Mich.
Wilson, K. R., Buffalo, N. Y.

Presses, Bench

Atlas Press Co., Kalamazoo, Mich.
Greenerd Arbor Press Co., Nashua, N. H.

Presses, Broaching

Greenerd Arbor Press Co., Nashua, N. H.

Presses, Foot

Fanco Machine Co., Racine, Wis.
Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Presses, Forming

Marshalltown Mfg. Co., Marshalltown, Ia.

Presses, Hydraulic

Atlas Press Co., Kalamazoo, Mich.
Greenerd Arbor Press Co., Nashua, N. H.
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Presses, Inclined

Federal Press Co., Elkhart, Indiana.
Marshalltown Mfg. Co., Marshalltown, Ia.
Ross Co., David J., Benton Harbor, Mich.

Presses, Punch

Dreis & Krump Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.
Federal Press Co., Elkhart, Indiana
Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Presses, Sheet Metal

Federal Press Co., Elkhart, Indiana

Presses, Steel

Verson Allsteel Press Co., 9303 S. Kenwood Ave., Chicago, Ill.

Buyers' Directory

Profiling Machines

Gorton Machine Co., Geo., Racine, Wis.
Oliver Instrument Co., Adrian, Mich.

Pulleys, Steel and Wood

Delta Mfg. Co., Milwaukee, Wis.

Pumps

Brown & Sharpe Mfg. Co., Providence, R. I.
Galland-Henning Mfg. Co., Milwaukee, Wis.

Pumps, Coolant

Ruthman Machinery Co., Cincinnati, Ohio
Tomkins-Johnson Co., Jackson, Mich.

Pumps, Lubricant

Ruthman Machinery Co., Cincinnati, Ohio

Punch, Shear and Bender, Hand

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Buffalo Forge Co., Buffalo, N. Y.

Punch Press Guards

Ross Co., David J., Benton Harbor, Mich.

Punch Retainers

Hovis Screwlock Co., Detroit, Mich.

Punches and Dies

Hovis Screwlock Co., Detroit, Mich.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Punches, Hand

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Buffalo Forge Company, Buffalo, N. Y.
Hovis Screwlock Co., Detroit, Mich.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.
Sampson Tool Co., 101 Walker St., New York
Ward Machinery Co., 504 W. Washington, Chicago, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Quick Change Collets & Chucks

Jarvis Co., Charles L., Middletown, Conn.

Racks, Bar Stock

Western Tool & Mfg. Co., Springfield, Ohio
Wm. S. Yohe Supply Co., Canton, Ohio

Reamers

Glenzer Co., J. C., Detroit, Mich.
Renu Tool Company, Detroit, Mich.

Rivets

Hassall, John, Inc., Brooklyn, N. Y.

Rivets, Tubular and Split

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Riveters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.
Tomkins-Johnson Co., Jackson, Mich.

Riveters, "Hy-Power" Hydraulic

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Riveters, Multiple Spindle

Grant Mfg. & Machine Co., Bridgeport, Conn.

Riveters, Pneumatic

Grant Mfg. & Machine Co., Bridgeport, Conn.
Hanna Engineering Works, 1703 Elston Ave., Chicago, Ill.
Hannifin Mfg. Co., 621 S. Kolmar Ave., Chgo.

Riveting Machines

Buffalo Forge Co., Buffalo, N. Y.
Grant Mfg. & Machine Co., Bridgeport, Conn.
Hanna Engineering Works, 1703 Elston Ave., Chicago, Ill.
Linley Bros. Co., Bridgeport, Conn.

Riveting Machines, Tubular and Split

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Rod Cutters

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Rotary Converters

Janette Mfg. Co., 556 W. Monroe St., Chicago

Rotary Files

Ford Mfg. Co., M. A., Davenport, Iowa
Grobet File Corp. of America, 3 Park Place, New York, N. Y.
Hamilton Tool Co., Hamilton, Ohio
Jarvis Co., Charles L., Middletown, Conn.
Pratt & Whitney Div., Hartford, Conn.

Router Bits

American Rotary Tools Co., 44 Whitehall St., New York, N. Y.
Putnam Tool Co., Detroit, Mich.

Sanders

Jarvis Co., Charles L., Middletown, Conn.
Mail Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.

Saws

Black Diamond Saw & Machine Works, Inc., Natick, Mass.

Saws, Electric Hand

Delta Mfg. Co., Milwaukee, Wis.
Mail Tool Co., 7742 S. Chicago Ave., Chicago, Ill.
Stanley Electric Tool Div., New Britain, Conn.

Saws, Rotary Hack

Stanley Electric Tool Div., New Britain, Conn.

Saw Sharpening Machines

Rogers & Co., Buffalo, N. Y.
Wardwell Manufacturing Co., Cleveland, Ohio

Sawing Machines

Continental Machine Specialties, Minneapolis
Delta Mfg. Co., Milwaukee, Wis.
Grob Brothers, Grafton, Wis.
Wells Mfg. Co., Three Rivers, Mich.

Scraping Machines, Hand & Pneumatic

Anderson Bros. Mfg. Co., Rockford, Ill.

Screw Drivers, Electric

Haskins Company, R. G., 623 S. California Ave., Chicago, Ill.
Jarvis Co., Charles L., Middletown, Conn.
Stanley Electric Tool Div., New Britain, Conn.
Stow Manufacturing Company, Binghamton, N. Y.

Screw Machine Parts

Modern Collet & Machine Co., Ecorse, Mich.
Sutton Tool Company, Detroit, Mich.

Buyers' Directory

Screw Machine Products

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.

Screw Machines, Automatic

Brown & Sharpe Mfg. Co., Providence, R. I.

Screws

Hassal, John, Inc., Brooklyn, N. Y.

Scribers

Ford Motor Co., Johansson Div., Dearborn, Mich.
Starrett Co., L. S., Athol, Mass.

Set Screws, Headless and Hollow

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.

Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

Standard Pressed Steel Co., Jenkintown, Pa.

Triplex Screw Co., Cleveland, Ohio

Set-Up Appliances

Standard Shop Equipment Co., Inc., Phila., Pa.

Shafts, Flexible

Haskins Company, R. G., 623 S. California Ave., Chicago, Ill.

Jarvis Co., Charles L., Middletown, Conn.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Pratt & Whitney, Hartford, Conn.

Stow Manufacturing Company, Binghamton, N. Y.

Strand Co., N. A., 5901 N. Wolcott St., Chicago

Shafts, Hangers & Boxes

Delta Mfg. Co., Milwaukee, Wis.

Shapers

Atlas Press Co., Kalamazoo, Mich.

Shaping Machines

Osborne & Sexton Machinery Co., Columbus, O.

Shears, Bevel

Marshalltown Mfg. Co., Marshalltown, Ia.

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Shears, Electric

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Shears, Hand

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.

Beverly Shear Co., 3007 W. 110th Pl., Chicago

Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

National Machine Tool Co., Racine, Wis.

Whitney Metal Tool Co., Rockford, Ill.

Shears, Power

Buffalo Forge Co., Buffalo, N. Y.

Dreis & Krump Mfg. Co., 7440 Loomis, Chicago

Stanley Electric Tool Div., New Britain, Conn.

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Shears, Slitting

Beverly Shear Co., 3007 W. 110th Pl., Chicago

Buffalo Forge Co., Buffalo, N. Y.

Dreis & Krump Mfg. Co., 7400 Loomis, Chicago

National Machine Tool Co., Racine, Wis.

Shears, Splitting

Marshalltown Mfg. Co., Marshalltown, Ia.

Shears, Throatless

Beverly Shear Co., 3007 W. 110th Pl., Chicago

Marshalltown Mfg. Co., Marshalltown, Ia.

Sheet Metal Working Machinery

Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Shelving, Steel

Interior Steel Equipment Co., Cleveland, Ohio

Shop Lights

Vinco Mfg. Co., Buffalo, N. Y.

Sine Bars

Ford Motor Co., Johansson Div., Dearborn, Mich.

Sine Tables

Robbins Company, Omer E., Detroit, Mich.

Slieves

Glenzer Company, J. C., Detroit, Mich.

Socket Head Cap Screws

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.

Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

Standard Pressed Steel Co., Jenkintown, Pa.

Soldering Tools, Electric

Ideal Commutator Dresser Co., Sycamore, Ill.

Spacing Collars

Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Special Tools and Machinery

American Tool Works, Inc., Hartford, Conn.

Speed Reducers

Abart Gear & Mch. Co., 4832 W. 16th St., Chgo.

Armigo Co., Milwaukee, Wis.

Chicago Gear Works, 769 W. Jackson Blvd., Chicago, Ill.

Cullman Wheel Co., 1359 Altgeld St., Chicago

Janette Mfg. Co., 552 W. Monroe St., Chicago

Speed Saws, Universal

Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

Spools & Nuts for Auto. Screw Machines

Sutton Tool Co., Detroit, Mich.

Split Rivets

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Split Rivet Setters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Spot Welding Machines, Speed

Armigo Co., Milwaukee, Wis.

Elster Engineering Co., Inc., Newark, N. J.

Interstate Machinery Co., Chicago, Ill.

Pier Equipment Mfg. Co., Benton Harbor, Mich.

Sprockets

Cullman Wheel Co., 1359 Altgeld St., Chicago

Stake Riveters

Marshalltown Mfg. Co., Marshalltown, Ia.

Stampings

Hamilton Tool Co., Hamilton, Ohio

Steel Stamps

Colonial Bushings Co., Detroit, Mich.

Stools, Shop

Standard Pressed Steel Co., Jenkintown, Pa.

Stop Watches

Meylan, A. R. & J. E., 266 W. 40th St., N.Y.C.

Storage Racks

Interior Steel Equipment Co., Cleveland, Ohio

Stackbin Corp., Providence, R. I.

Yohe Supply Co., Canton, Ohio

Straight Edges

Ford Motor Co., Johansson Div., Dearborn, Mich.

Straightening Machines

Whitney Metal Tool Co., Rockford, Ill.

Stripping Units

Strippit Corp., Buffalo, N. Y.

Studs, Milled

Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

Tables, Drawing

Hamilton Mfg. Co., Two Rivers, Wis.

Tables, Sine

Robbins Company, Omer E., Detroit, Mich.

Tap Extractors

Walton Co., Hartford, Conn.

Buyers' Directory

Tap Holders

Procurier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.
Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Tapes, Steel

Starrett Co., L. S., Athol, Mass.

Tapping Machines and Attachments

Burke Machine Tool Co., Conneaut, Ohio
Cleereman Machine Tool Co., Green Bay, Wis.
Errington Mechanical Laboratories, Staten Island, N. Y.
Etico Tool Co., 504 Johnson Ave., Brooklyn, N. Y.
Haskins Company, R. G., 623 S. California Ave., Chicago, Ill.
Jarvis Co., Charles L., Middletown, Conn.
Master Tapper Company, Belleville, N. J.
Procurier Safety Chuck Co., 14 So. Clinton St., Chicago, Ill.
Whitney Metal Tool Co., Rockford, Ill.

Thread Grinders

Ex-Cell-O Corp., Detroit, Mich.

Threading Machines, Automatic

Grant Mfg. & Machine Co., Bridgeport, Conn.

Threading Tools

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Ridge Tool Co., Elyria, Ohio
Rivett Lathe & Grinder, Inc., Brighton, Boston

Timing Instruments

Meylan, A.R. & J.E., 266 W. 40th St., N. Y. C.

Tool Heads, Universal

Precision Tool Co., Bridgeport, Conn.

Tool Holders

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.
Michigan Tool Co., Detroit, Mich.
Rigid Tool Holder Co., Detroit, Mich.
Western Tool & Mfg. Co., Springfield, Ohio
Ziegler Tool Co., Detroit, Mich.

Tool Post Turrets

Colwell, S. G., Providence, R. I.

Tool Reclaiming

Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.
Renu Tool Company, Detroit, Mich.

Tool Salvage

Renu Tool Company, Detroit, Mich.

Tools, Boring

Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.
Comet Tools, Inc., 39 Union Square, New York

Tools, Lathe and Planer

Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.

Tools, Machinists'

Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.
Brown & Sharpe Mfg. Co., Providence, R. I.

Tram Points

Ford Motor Co., Johansson Div., Dearborn, Mich.

Transmissions, Variable Speed

Ideal Commutator Dresser Co., Sycamore, Ill.
Lenney Machine & Mfg. Co., Warren, Ohio

Tube Flanging Machines

Grant Mfg. & Mch. Co., Bridgeport, Conn.

Tabular Rivet Setters, Automatic Feed

Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O. Chicago, Ill.

Tungsten Carbide Tools

Michigan Tool Co., Detroit, Mich.
Willey's Carbide Tool Co., Detroit, Mich.

Turning Tools

R & L Tools, Philadelphia, Pa.

Universal Joints

American Tool Works, Inc., Hartford, Conn.

Used and Rebuilt Machinery

Aaron Machinery Co., 176 Lafayette St., N. Y.
Belyea Co., Inc., 150 W. 18th St., New York
Bennet-Harkin Machine Tool Corp., 30 Church St., New York, N. Y.
Bernstein & Co., Geo. M., 12 S. Clinton, Chgo.
Bleser Mfg. & Mch. Co., Springfield, Ill.
Botwinik Brothers, Inc., New Haven, Conn.
Broadway Machinery Co., Inc., 211 Centre St., New York, N. Y.
Brown Machinery Co., St. Louis, Mo.
Cincinnati Machy. & Supply Co., Cincinnati, O.
Clinton Machinery Co., 33 S. Clinton St., Chicago
DeWitt Tool Co., 173 Grand St., New York, N. Y.
Eastern Machinery Co., Cincinnati, Ohio
Emmerman, Louis E. & Co., 1761 Elston, Chicago
Easley Machinery Co., E. L., 831 W. Evergreen Ave., Chicago, Ill.
Falk Mill Supply Co., Inc., Rochester, N. Y.
General Blower Co., 401 N. Peoria St., Chicago
General Machinery Corp., Boston, Mass.
Hackett Co., J. Lee, Detroit, Mich.
Hill, Clarke & Co., 645 W. Washington, Chgo.
Hyman & Sons, Joseph, Philadelphia, Pa.
Indianapolis Mch. & Supply Co., Indianapolis
Industrial Machinery Co., Indianapolis, Ind.
International Machinery Co., Detroit, Mich.
Interstate Machinery Co., 109 S. Clinton, Chgo.
Iroquois Machinery Co., Buffalo, N. Y.
Johnson & Sons Mch. Co., Wm. C., St. Louis
Jones Machine Tool Co., Cincinnati, Ohio
Klauber Machinery Co., St. Louis, Mo.
Lang Machinery Co., Pittsburgh, Pa.
McDonald Machinery Co., St. Louis, Mo.
Marr-Galbreath Mch. Co., Pittsburgh, Pa.
Midwest Equipment Co., 628 W. Lake, Chicago
Miles Machinery Co., 2025 Genesee Ave., Saginaw, Mich.
Modern Machinery Co., 243 Centre St., New York, N. Y.
Morey Machinery Co., Inc., 410 Broome St., New York, N. Y.
Morris Machinery Company, Inc., Newark, N. J.
Nelson Machinery Co., Green Bay, Wis.
Norton-Broadway Machinery Co., Cincinnati, O.
Nutmeg State Mch. Corp., New Haven, Conn.
O'Brien Machinery Co., Philadelphia, Pa.
Osborne & Sexton Machinery Co., Columbus, O.
Oit Machinery Sales Co., Detroit, Mich.
Reliance Machinery Sales Co., Pittsburgh, Pa.
Reynolds Machinery, Providence, R. I.

Buyers' Directory

Used and Rebuilt Machinery—Cont.

Rosenkranz & Weisbecker, 2309-A Singer Bldg., New York City
 Royal Machinery Exchange, 401 Broome St., New York, N. Y.
 Scott-Bansbach Mch'y. Co., 4607 W. 20th. Chgo.
 Segal Machinery Co., 117 S. Clinton St., Chicago
 Service Co., Cleveland, Ohio
 Simmons Machine Tool Corp., Albany, N. Y.
 Standard Machinery Co., Grand Rapids, Mich.
 Strong, Carlisle & Hammond Co., Cleveland, O.
 Superior Machinery Co., Albert City, Iowa
 Surplus Material & Machinery Co., Detroit, Mich.
 Surplus Stock & Mch'y. Co., Inc., 618 W. Lake St., Chicago, Ill.
 Travers Tool Co., 5 Court Square, Long Island City, N. Y.
 United Machinery & Supply Co., St. Louis, Mo.
 Victor Machinery Co., 130 S. Clinton, Chicago
 Victor Machinery Exchange, 251 Centre St., New York, N. Y.
 Vine, R. A., Detroit, Mich.
 Wertman Machinery Co., Cleveland, Ohio
 West Penn Machinery Co., Pittsburgh, Pa.
 White Mch'y. Co., A. D., 108 N. Jefferson, Chgo.
 Wigglesworth Machinery Co., Cambridge, Mass.

Valves, Air

Air-Way Pump & Equipment Co., 617 W. Jackson, Chicago, Ill.
 Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Nicholson & Co., Wilkes-Barre, Penna.
 Ross Operating Valve Co., Detroit, Mich.
 Tomkins-Johnson Co., Jackson, Mich.

Valves

Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Ross Operating Valve Co., Detroit, Mich.

Valves, Foot, Lever & Solenoid

Berkeley Engineering Co., Cleveland, Ohio
 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Nicholson & Co., W. H., Wilkes-Barre, Pa.
 Ross Operating Valve Co., Detroit, Mich.

Valves, Hydraulic

Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Nicholson & Co., Wilkes-Barre, Penna.

Valves, Operating

Berkeley Engineering Co., Cleveland, Ohio
 Galland-Henning Mfg. Co., Milwaukee, Wis.
 Hanna Engineering Works, 1763 Elston, Chicago
 Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago
 Ross Operating Valve Co., Detroit, Mich.

Vises, Drilling Machine

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.
 Armstrong Bros. Tool Co., 308 N. Francisco Av., Chicago, Ill.
 Johnson Tool Co., Inc., East Providence, R. I.
 L-W Chuck Co., Toledo, Ohio
 Modern Machine Tool Co., Jackson, Mich.
 National Machine Tool Co., Racine, Wis.
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Plunket Machine Co., 1823 W. Lake St., Chicago
 Sampson Tool Co., 101 Walker St., New York
 Yost Mfg. Co., Meadville, Pa.

Vises, Machinists'

L-W Chuck Co., Toledo, Ohio
 Miller & Crowningshield, Greenfield, Mass.
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Western Tool & Mfg. Co., Springfield, Ohio
 Yost Mfg. Co., Meadville, Pa.

Vises, Milling Machine

Hartford Special Mch'y. Co., Hartford, Conn.
 L-W Chuck Co., Toledo, Ohio
 Miller & Crowningshield, Greenfield, Mass.
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Plunket Machine Co., 1823 W. Lake St., Chicago
 Yost Mfg. Co., Meadville, Pa.

Vises, Precision

Odin Universal Corp., 110 S. Dearborn, Chicago

Vises, Shaper

L-W Chuck Co., Toledo, Ohio
 Odin Universal Corp., 110 S. Dearborn, Chicago
 Plunket Machine Co., 1823 W. Lake St., Chicago

Welders, Arc

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Welders, Portable

Hobart Brothers, Troy, Ohio

Welding Accessories

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

Welding Electrodes and Holders

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

Welding Generators, Arc

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio

Welding Machines, Electric Spot

Armco Co., Milwaukee, Wis.
 Eisler Engineering Co., Inc., Newark, N. J.
 Interstate Machinery Co., Chicago, Ill.
 Lenney Machine & Mfg. Co., Warren, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.
 Ward Machinery Co., 564 W. Washington, Chicago, Ill.

Welding Machines and Equipment, E. I. Arc

Hobart Brothers, Troy, Ohio
 Lincoln Electric Co., Cleveland, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Welding Machines, Resistance

Armco Co., Milwaukee, Wis.
 Eisler Engineering Co., Inc., Newark, N. J.
 Lincoln Electric Co., Cleveland, Ohio
 Pier Equipment Mfg. Co., Benton Harbor, Mich.

Wire Mill Equipment

Sleeper & Hartley, Inc., Worcester, Mass.

Wire Working Machinery

Sleeper & Hartley, Inc., Worcester, Mass.

Woodworking Machinery

Tannevitz Works, Grand Rapids, Mich.

Worm Drives

Michigan Tool Co., Detroit, Mich.

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FOR SALE BY

Aaron Machinery Co.,
176 Lafayette St., New York, N. Y.

Drill press, 3 spdl. Henry & Wright, m. d., a. c., #485.
Engraving machines, Gorton-Deckel.
Lathes, all sizes, all types.
Lathes, bench, Rivett-Ames.
Miller, Brown & Sharpe, No. 2 plain, #475.
Millers, Becker vert., No. 2, 2A, rot. tables.
Pipe machines, Williams, motor drive, 4" and 6".
Shapers, 16" G. & E.; Stockbridge: Ohio.
Shears, squar., pwr. and foot, 8', 18 and 12 ga.
Turret lathes, B. & O.; P. & W.; W. & S.

FOR SALE BY

Modern Machinery Co.
243 Centre St., New York, N. Y.

Drill presses, Allen b. b., 2, 3, 4 and 6 spindles 12 & 15".
Grinders, B. & S. No. 1 universal.
Lathes.
Milling machines, Van Norman Nos. 1, 2 and 3, m. d. and s. p. d.
Milling machines, universal, B. & S., Cincinnati and Rockford.
Radial drills.
Screw machines.
Shapers.

FOR SALE BY

Surplus Material & Machinery Co.
8735 Kercheval Ave., Detroit, Mich.

Bolt threader, 1" Landis.
Chaser grinder, No. 29 National Acme.
Drill, 3 spindle Allen, motor drive.
Drill, 5 spindle Detroit horizontal, s. p. d.
Drill, 21" Cincinnati, production, motor drive, (2).
Drill, radial, 3' Western, arranged for motor drive.
Die slotter, Garvin, 3 1/2" stroke.
Folder, 42" Jarecki, power.
Furnace, Bellevue electric, melting.
Grinder, No. 2 Brown & Sharpe.
Grinder, No. 78 Wilmarth & Morgan, surface.
Grinder, No. 33 Abrasive, surface.
Grinder, No. 3 Wilmarth & Morgan, surface.
Grinder, No. 22 Heald rotary, surface.
Grinder, No. 70 Heald internal (2).
Grinder, No. 2 Oakley universal, tool and cutter.
Grinder, No. 1 Norton, tool a-d cutter.
Grinder, No. 1 LeBlond, tool and cutter.

FOR SALE BY

Failor-Strafer Machinery Co.
136 Liberty St., - - New York, N. Y.

Bolt cutter, 2" Landis double head, motor drive.
Brake, All-Steel Chicago Leaf 10'x12 ga. arr. m. d.
Brakes, Oil Power Press, 10'x10 ga. and 3/16".
Crane, 10 ton Niles, 37' span, a. c. motors.
Grinder, No. 14 Pratt & Whitney b. b., vert. surface.
Grinder, No. 16 Blanchard high power vert., sur., m. d.
Lathe, 26'x14' Bridgeford, geared head, m. d., taper.
Lathe, 48'x34' Bridgeford geared head, motor drive.
Lathe, 86'x27' Johnson, geared head, motor drive.
Lathes, turret, (2) 24" Libby h. d. Model C, m. d.
Miller, Becker, duplex Lincoln type.
Miller, Brown & Sharpe No. 24 plain.
Shear, squaring, 36" Bliss, capacity 5/16".
Shear, squaring 10' Geo. Ohl, cap. 3/16", motor drive.
Table, circular, 42" mounted on base with cross adjust.

FOR SALE BY

Service Co.,
3732 Cedar Ave., - - Cleveland, Ohio

WELDERS.

General Electric 200-amperes, A. C. (10).
Lincoln 200 ampere with 4 cylinder engine (4).
Lincoln 300-ampere, gas engine drive (4).
Transformer type A. C. welders, 220-440 volt (20).
F. K. W. Lincoln 200 ampere a. c. drive (30).
We rebuild, buy, sell and rent welders.

FOR SALE BY

The Nutmeg State Machinery Corp.
1041-1051 State St., New Haven, Conn.

Headers, double stroke solid die, Waterbury Farrel, toggle type, pedestal type, No. 0 (2), and No. 1.
Priced low for quick sale.

FOR SALE BY

Industrial Machinery Company, Inc.
2200-2300 Fletcher Av. Indianapolis, Ind.

CINCINNATI PLANNER 42" between housings, 36" under the rail, table 8" between pockets; equipped with two heads on the cross rail.

USED AND REBUILT MACHINERY

FOR SALE BY

Surplus Stock & Machinery Co.,

620 W. Lake St., - Chicago, Ill.

Drill presses, 1, 2, 3 & 4 spindle high speed ball bear., all makes, Nos. 1 & 2 Morse taper, hand or paw. feed.
 Lathe, 16" x8" Hendey taper attach., draw bar, collets.
 Lathe, 16" x8" Lodge & Shipley 12 speed selective hd.
 Lathe, 16" x10" Monarch, geared head, motor in base.
 Mill, No. 2 Cincinnati plain, high power, late type.
 Mill, No. 2 Brown & Sharpe universal, cone driven.
 Shapers, 16", 20", 24" Gould & Eberhardt.

Complete stock of metal working machinery.

Send us your inquiries.

FOR SALE BY

Norton-Broadway Machinery Co.

610-614 Baymiller St., Cincinnati, Ohio

Armature winding machine, with d. c. motor.
 Drill, upright, 28" Kern, back geared.
 Drill, upright, 20" Plain with pat. chuck table.
 Emery stand, Webster & Perks.
 Forge, large, blower and anvil.
 Grinder, wet emery, Barnes, wheel 16" x3".
 Lathe, engine, 45" x16" 8" Fifield, triple geared.
 Price for the lot \$475 cash, FOB Springfield, Ohio

FOR SALE BY

General Blower Company

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BLOWERS—FANS—EXHAUSTERS.

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Oil and gas burners, cupolas, furnaces, etc.

Roots—Connorsville and centrifugal blowers.

What are your blower requirements?

FOR SALE BY

Rosenkranz, Weisbecker & Company, Inc.
2308 Singer Building, New York, N. Y.

Boring mill, 60" Gisholt, rapid traverse, motor drive.
 Boring mill, 42" Niles-Bement-Pond vertical, m. d.
 Drill, radial, 2" American, motor drive.
 Drill, multiple spindle, No. 14 Natco, motor drive,
 16" x24" rectangular head, tapping attachment.
 Drill, multiple spindle, No. 30 Natco, m. d., 20" round hd.
 Grinder, 26" x120" Laudis, plain, cylindrical, m. d.
 Keyseaters, No. 31 Baker and No. 20 Catlin, m. d.
 Lathe, 72" x40" Putnam, geared head, motor drive.
 Lathe, 64" x35" Gleason, motor drive.
 Lathe, 42" x18" Pittsburgh, quick change gear.
 Lathe, 28" x17" Chard, motor drive.
 Planer, 72" x72" x12" Cincinnati, 3 hds., m. d., rap. trav.
 Saw, No. 300 Espen-Lucas, hydraulic feed, motor dr.

FOR SALE BY

28th St. & A. V. R. R.

Pittsburg, Pa.

Lang Machinery Company

Air compressors, (2) Sullivan, 480 c. f. 100 lb. b. m. d.
 Automatic, No. 9 Brown & Sharpe belt drive.
 Automatic, No. 52 National Acme 4-spindle, cap. 8" b. d.
 Automatic, model M Cleveland, 4 spindle motor drive.
 Bender, No. S19 Kane & Roach, 4" rd. motor drive.
 Bolt cutter, 1" Landis, 18" Acme, sgl. hd., b. d.
 Boring mill, 30" Bullard, threading attach., s. p. d.
 Boring mill, vertical 34" Sellers, 2 heads, belt drive.
 Boring mill, horiz. 6" Bement-Miles, floor type, m. d.
 Borer, port., N. B. P. Duplex, 44" bars, m. d.
 Boring mill, horizontal No. 0 Giddings & L. 3", m. d.
 Brakes, leaf, Chicago, 7' x10 ga., 8' x12 ga., 10' x10 ga.,
 10' x16", 10' x18 ga. hand.
 Brake, press type, 8' x20 ga. Vulcan, b. d.
 Buffer and polisher, 14 h. p. Marbach, 220/3/60.
 Drill, heavy duty No. 1 Baker, 24" capacity 24", s. p. d.
 Drills, radial, 24" Cincinnati-Bickford, t. a., m. d.
 Drills, upright, 14" to 32", belt drive.
 Drill, 4 spindle No. 2 Foote-Burt, cap. 18" m. d.
 Furnaces, hardening, Tate Jones 27" x20" x12", new.
 Gear hobber, No. 18H Gould & Eberhardt, m. d.
 Gear millers, No. 1 Bilton, capacity 4" belt drive.
 Grinder, ring surface, No. 200 Heald, belt drive.
 Grinder, surface, No. 2 Reid, 15" x6", belt drive.
 Grinder, surface, 12" Pratt & Whitney vertical, m. d.
 Hammer, 100 lb. Bradley cushion helve belt drive.
 Hammer, No. 4-N. N. S. a. c. motor drive.
 Hammer, steam forging 5600 lb. Niles-Bement-Pond.
 Keyseater, No. 0 Mitts & Merrill, belt drive.
 Keyseater, No. 2 Baker, 2", belt drive.
 Keyseater, No. 4 Mitts & Merrill capacity 24" b. d.
 Lathe, 14" x8" Hendey, tie bar, c. g. t. a., b. d.
 Lathe, 16" x6" American high duty, c. g. t. a., b. d.
 Lathe, 24" x14" Monarch, geared head, c. g. t. a., b. d.
 Lathe, 25" x16" LeBlond, c. g. t. a., b. d., c. h. k. t. a., b. d.
 Lathe, 26" x12" Bridgeford, hvy. duty, c. g. t. a., b. d.
 Lathe, 36" x16" N. B. P. c. g. t. a., b. d.
 Lathe, 40" x30" H. S. & G. geared head, m. d.
 Lathe, 51" x32" New Haven, triple geared, motor drive.
 Lathe, turret, No. 2 A Warner & Swasey, s. p. d.
 Lathe, turret, 24" Steindle, 8" hollow spindle, m. d.
 Miller, plain, No. 1 Kempsmith, 42" x10", belt drive.

Miller, plain, No. 2 Cincinnati, tbl. 46-4" x10", b. d.
 Miller, plain, No. 24 LeBlond, tbl. 52" x11-8", b. d.
 Miller, plain No. 25 Ohio, table 52" x11-8", belt drive.
 Miller, plain No. 4 LeBlond, table 72" x16", belt drive.
 Miller, plain, No. 24 Brown & S. tbl. 90" x17-4", b. d.
 Miller, production No. 33 Kempsmith belt drive.
 Millers, universal Nos. 25 and 35 Oesterlein, b. d.
 Miller, universal, No. 2-A B. & S., s. p. d.
 Miller, universal No. 2B Hendey tbl. 45" x10", b. d.
 Miller, vertical, model "B" Becker tbl. 45" x12", s. p. d.
 Pipe machines, Landis 4" to 2", belt drive, (2).
 Pipe machine, No. 394-B Oster, 1" to 4", motor drive.
 Pipe machine, 8" Williams, 24" to 8" motor drive.
 Pipe machine, No. 116 Merrill, 12" to 12", motor drive.
 Pipe straightener, vertical, 6" Woodward, m. d.
 Planers, 36" x36" x10" Cincinnati, 2 heads, belt drive.
 Press, double acting, No. 1 Bliss, belt drive.
 Presses, No. 5 Bliss stiles type, bed 17" x20", st. 2", b. d.
 Press, trimming, No. 12 Erie, bed 26", str. 54", side sh.
 Press, wheel, 200-ton Hydraulic, 48" x100", m. d.
 Profilers, Nos. E3 and E4, Keller, motor drive.
 Punch & shear, "C" Cleveland 13/16" x4" belt drive.
 Rolls, angle, Kane & Roach 2" x2" x3", motor drive.
 Saws, hack 6" x6" Racine belt dr. — No. 5 Marvel m. d.
 Saws, hack 12" x12" Racine, single pulley drive.
 Saw, hack 13" x16" Peerless, motor drive.
 Shaper, 28" Queen City, back geared, belt drive.
 Shapers, 24" Gould & Eberhardt, V-rail, belt drive.
 Shaper, 24" Smith & Mills, back geared, belt drive.
 Shaper, 20" Cincinnati, back geared, belt drive.
 Shaper, 16" American, back geared, belt drive.
 Shear, rotary, No. 10 Quickwork, 14 ga. 60" throat.
 Shear, rotary, Lennox, 8" 42" throat, b. d.
 Shear, square 36" x16" Niagara motor drive.
 Shear, squaring, 10" x22 ga. Peerless, fool.
 Shear, squaring, No. 4 Bertsch, 10" x16 ga. m. d.
 Shear, square 156" x17" Hyde Park, 18" gap, motor drive.
 Straightener, No. 24 Sutton-Abramson, m. d.
 Straightener, No. 1 Kane & Roach cap. 3" rd. m. d.
 Straightener, pipe, 8" Woodward, vertical, m. d.
 Straightener, 14" x4" F. B. Schuster, belt drive.
 Welders, arc, 300 ampere Lincoln, 220 volt, d. c.

USED AND REBUILT MACHINERY

FOR SALE BY

United Machinery & Supply Co.
1241 Walton Ave., - St. Louis, Mo.

Brake, leaf, D. & K., 10"x10 ga. No. 204, a. c., m. d.
 Broach, LaPointe No. 3B, double friction clutch, b. d.
 Brocher, univ. No. 13 Brown & S., many attach., b. d.
 Miller, slab, Beaman Smith 354" bet. uprights, m. d.
 Nibbler, No. 1A, 10" throat, m. d., a. c. Also No. 1,
 6" throat, belt drive.
 Press, hyd. 4 post vertical, 400 ton Southwark.
 Press, No. 4P Ferracute, 5500 lbs., 14" stroke.
 Shapers, Fellows gear, 24" (3).
 Shear, circle & flanging, No. 208A Niagara, a. c., m. d.
 Shear, Hertsch 6 1/2" cab., 15" throat, b. g., b. d.

FOR SALE BY

Segal Machinery Company
117 S. Clinton St., - Chicago, Ill.

Air compressors, 10x10 Inger-Rand, Class E. R. I.
 Boring mill, 42" Bullard, two heads on rail.
 Radial drills, 3" Bickford, s. p. d., motor drive.
 5" Niles-Hement-Pond, single pulley drive.
 Lathes, 18x5 Sebastian, motor in base, c. q. c. g.
 24x12" Milwaukee, semi-q. c. g. taper attachment.
 Millers, No. 3 Brown & Sharpe vertical, motor drive.
 No. 2 Kemp-Smith universal, dividing head.
 Screw machines, No. 0 Brown & Sharpe automatic.
 14" Acme universal, geared head, collets & tools.
 Shaper, 20" G. & E., hi-duty, 28" American b. g.
 Partial list - Send us your inquiries.

FOR SALE BY

West Penn Machinery Company

Air compressors, 30 to 2500 cubic feet.
 Automatic National Acme "C" 9/16, m. d. 220/3/60.
 Blower, No. 4 Roots, capacity 2110 c. f. m.
 Bolt cutter, Acme 2", belt drive.
 Boring mill, 42" King, belt drive.
 Boring mill, 62" Betts, 2 heads, belt drive.
 Boring mill, hor. 34" Rockford, m. d. 220/3/60.
 Brake, 7"x10 gauge Drex & Krump motor dr. 220/3/60.
 Bulldozers, Nos. 2, 4, 6, 8, 20, & 30.
 Crane, 5-ton Cap. 65' span, 220-d.c.
 Drill, radial, 4" Prentice, tapping attachment, b. d.
 Drill, radial, 5" Cincinnati-Bickford, motor drive 220 d.c.
 Drill, radial, 5" Fossdick m. d. 220/3/60.
 Drill, radial 6" Reed-Prentice, single pulley drive.
 Drill, multiple 25 spindle No. 30 Natco.
 Drills, upright 10" to 36".
 Engine, gas, 20 horse power Bessemer.
 Flanger, McCabe, 4" capacity, dies.
 Flanger, No. 208 Niagara, 10 Ga. b. d.
 Gear cutter, No. 5 Brown & Sharpe, 60x11 motor drive.
 Gear cutters, 11", 18" & 24" Gleason.
 Gear tester, bevel 18" Gleason.
 Grinder, centerless, No. 2 Cincinnati m. d. 220/3/60.
 Grinder, roll, Farrel 28"x16".
 Grinder, double end 2 horse power 220/440/3/60.
 Grinder, D. E., 3 horse power 220/3/60.
 Grinder, disc, No. 8-20 Besly, belt drive.
 Grinder, disc, No. 4 Gardner, motor drive, 220/3/60.
 Grinder, Gisholt tool and cutter, motor drive, 220/3/60.
 Grinder, surface 8" Heald b. d.
 Grinder, internal No. 60 Heald, belt drive.
 Groover, No. 275-A Niagara, 6", 16 ga. motor drive.
 Hammer, power, 50-lbs. Blacker.
 Hammer, power, 90-lb. upright, belt drive.
 Hammer, power, 100 lb. Bradley cushion helve.
 Hammer, Bradley 500 lb. upright.
 Hammers, Nos. 2-B, 3-B, 4B, Nasel.
 Hammers, steam, forging & drop.
 Hoist, 1 ton Shepherd 220-V, direct current.
 Keyseater, No. 2 & No. 0 Mitts & Merrill, belt drive.
 Lathes, 20 ton Whiting, top pour.
 Lathe, 11"x5" Meyers, plain change gear, belt drive.
 Lathe, 16"x6" Fossdick, double back gear, q. c. g.
 Lathe, 18"x8" Springfield, geared head t. a.
 Lathe, 20x10 geared head Schellenbach, s. p. d.
 Lathe, 22"x12" R-L quick change gear, d. b. g.
 Lathe, 24x10 Lodge & Shipley, q. c. g., d. b. g., t. a.
 Lathe, 24"x15" Prentice, geared head s. p. d., t. a.
 Lathe, 27"x12" LeBlond d. b. g., q. c. g.
 Lathe, 42"x16" Schumacher Boye, q. c. g., belt drive.
 Lathe, spinning 32" belt drive.
 Lathes, turret, No. 4 Warner & Swasey, belt drive.
 Lathe, turret, No. 2A Warner & Swasey, 34" m. d.
 Lathe, turret, 17x6 LeBlond double back gear.
 Miller, vert. No. 1 Brown & Sharpe, belt drive.
 Miller, vertical No. 2 Knight, b. d.
 Miller, vertical No. 6 Becker, motor drive.

1210 House Building, Pittsburg, Pa.

Mixers, Sprout-Waldron, batch & liquid.
 Pipe machine, 2" Landis, belt drive.
 Pipe machine, 4" Oster, 220-3-60 motor drive.
 Pipe mach, 2", 6", 8", 12" Williams, motor drive.
 Planer, 36x36x10" Cincinnati belt drive.
 Planer, 42x42"x12" Cincinnati, 3 heads., belt drive.
 Planer, 60x60x20" Pond motor drive.
 Press, wheel 125 ton Caldwell, 42", b. d.
 Press, cam, No. 60N Bliss, double action inclinable.
 Press, hydraulic 100-ton Southwark.
 Press, horning 42-A Toledo belt drive.
 Press, 19 Bliss open back inclinable 28" stroke.
 Press, No. 4 Toledo o. b. i., 30" stroke.
 Press, No. 55 Toledo, bed 20x19.
 Press, No. 58 Toledo, 8" stroke.
 Press, No. 77 Bliss, 8" stroke.
 Press, 78 Bliss, 12" stroke T. R.
 Press, double crank No. 5 Bliss, 2" stroke, b. d.
 Press, gap, No. 74 Bliss consolidated 44" stroke.
 Press, screw, No. 87 Niagara, hand power.
 Press, 6 spindle, Waterbury-Farrell.
 Punch, E.F. Cleveland, 36" throat, 14" thru 1".
 Punch, No. 4-A Kent Owens univ. comb., m. d., 220/3/60
 Pumps, centrifugal 6", 4", 1", motor drive.
 Riveters, air, hammer, spinning.
 Rolls, angle, Niagara 14x14".
 Rolling mill, cold 9"x18" motor drive.
 Saws, friction, Nos. 2, 3 & 4 Ryerson motor drive.
 Saw, cold, 45" Newton motor drive.
 Saw, hack, Peerless, 6x6 220-3-60.
 Saw, hack, Peerless, 13"x16", motor drive, 220/3/60.
 Saw, shaping, Peerless 6x6, 220-3-60.
 Shapers, 16", 20", 24" & 36" Gould & Eberhardt.
 Shears, alligator, 19", 2", 3", 4" & 6".
 Shear, Angle 6x6x1 Long & Allistair, m. d.
 Shear, circle, Niagara, 4" cutters, 16 ga.
 Shear, circle No. 3 Bliss, 40"x20 gauge.
 Shear, bar 14", New Doty, b. d.
 Shear, squaring No. 48 Exello 14 ga. bls. 53".
 Shear, plate, 60"x1" Pels.
 Shear, 24x12" Bliss, belt drive.
 Shear, rotary 24" throat capacity 8", m. d. 220/3/60.
 Slitter, gang, 36" Yoder motor drive.
 Slitter, gang, 36" Bradock, belt drive.
 Shear, paper 45"x14" Kent, belt drive.
 Slotters, 6" & 24" Newton.
 Straightener, 8/16"x20" Shuster V belt.
 Straightener, AS & TP 12"x16", belt drive.
 Straightener, 42" Aetna standard, 17 roll 24" m. d. 220/3/60.
 Straightener, 48" Aetna-Standard, 17 roll 34" m. d.
 Straightener, No. 5 K & R, 24" square belt drive.
 Tumbling barrel, 34"x45", belt drive.
 Thread roller, No. 60 W.F. capacity 14".
 Thread roller, No. 301 V. & O., 4", belt drive.
 Upsetters, 1" to 6".
 Welder, 6 k. w. spot Thompson.
 Welder, butt 14" Winfield.

USED AND REBUILT MACHINERY

FOR SALE BY

J. Bleser Mfg. & Machinery Co.

209 N. 16th; P.O. Box 793 Springfield, Ill.

Arc welder, Aladdin, complete.....\$ 25
Air compressor units, $\frac{1}{2}$ to 1 h. p.
Grinder, Landis universal, 10x30.....150
Lathe, 13"x5' Lodge & Shipley, q. c.....100
Lathe, 36"x18' Lodge & Shipley, q. c., arr. m. d.

FOR SALE BY

R. A. Vine,

652 West Willis Ave., Detroit, Mich.

NATCO-FOX-BAUSH.

Adjustable centers, 10-40 spindle arrangements.
Drillers and tappers, multiple spindle.
Scrap baler, Galland-Henning hydraulic.

FOR SALE BY

E. L. Klauber Machinery Co.

320-322 South Third St. St. Louis, Mo.

Bolt threading machine, 2" Landis, like new.
Riveters, No. 5-A high speed, No. 2 Grant; ham. type.
Screw machines, hand, 8", 4", 1", 11" bar feeds.
Turret lathes, No. 1, 2, 3, & 4 Foster, Bardons & Oliver.
Write for Stock List.

FOR SALE BY

Wayne Transmission & Machinery Sales
7810 Mack Ave., Detroit, Mich.

B. & S. GRINDERS & SCREW MACHINES
Grinders, No. 10 & 11 B. & S. Plain reconditioned at sacrifice prices.
Screw machines, (2) No. 00 Brown & Sharpe.

FOR SALE BY

Joseph Hyman & Sons,

Tioga and Almond Sts., Philadelphia, Pa.

WORLD'S LARGEST STOCK
POWER PRESSES

No. 10 Bliss, double crank, tie rod, 62", shaft 10".
No. SR 203 Ferracut double crank 52", shaft 7".
No. 1655 Consolidated, double crank, 41", shaft 4".
No. 734B Bliss, No. 764 Consolidated, cap types.
No. 14B, 34-B and No. 4 Bliss toggle presses.
No. 168, No. 164, Toledo toggle presses.
No. 594 Toledo, tie rod, No. 201 Ferracut, 200 ton.
No. 774 Bliss, tie rod, 12" stroke, straight side.
500 ton American Can coining; Waterbury 6 plunger.
150 ton No. E 52 Ferracut, 75 ton No. E51 Ferracut.
150 ton No. 661 Toledo, 250 ton Waterbury F. coining.
100 ton No. 21 Bliss, 50 ton No. 3 Bliss coining.
Squaring shears, various sizes.

These and hundreds of others of popular makes and sizes, are in stock at our warehouse here.

Rebuilt and Guaranteed.

FOR SALE BY

Marr-Galbreath Machinery Company

57 Water St.,

Pittsburgh, Pa.

Air compressor, 9x8" & 10x8" 1-R, "ER-1".
Blowers, pressure, Am. 11-PB, 14,000 CFM.
Boring mill, 42" Bullard, 1 swivel and 1 turret head.
Boring mill, 30" Bullard or VT L, threading attach.
Brake, 5"x18 ga. D. & K., hand.
Drill, 24" Aurora, tapping attachment.
Drill, No. 11-B, Natco, 16 spindle, motor drive.
Drill, radial, 3" Canedy-Otto.
Drill, radial, 5" Fossick, g. b., oil groove base, m. d.
Fan, ventilating, No. 4 American, 1/50/110.
Forging machine, 3" National, motor drive.
Forging machine, 3" & 4" Ajax, motor drive.
Forging machine, 14" Acme motor drive.
Furnace, gas, Tate-Jones, 25"x23"x12".
Grinder, No. 210 Heald rotary surface.
Grinder, 1/2 H.P. Mail, 1/60/110 flexible shaft.
Grinder, No. 21 Landis 10"x30".
Grinder, disc, No. 3 Gardner, 20" wheels, m. d. 3/40/220.
Hammer, 90 lb. Boss, belt drive.
Hammer, 200 lb. Beaudry, power.
Hammer, 400 lb. Bliss board drop, belt drive.
Hammer, 800 lb. Erie SF steam or air.
Hoists, chain, 1/2, 1, 1 1/2, 2, 3 & 5 tons.
Keysater, No. 00 Baker, capacity 7"x8", belt or m. d.
Keysaters, 3 M. & M., belt.
Lathe, 8" Hirth bench prec. thread att., tur. m. d..
Lathe, 9"x5" Monarch q. c. g., pan bed, t. a.
Lathe, 12"x8" Sebastian geared head, motor-in-base.
Lathe, 18"x8" Sebastian cone drive, motor-in-base.
Lathe, 16"x10" G-K, gear head, tap att., form motor drive.
Lathe, 18"x8" Superior, quick change gear, d. b. g.
Lathe, 20"x10" Johnson quick change gear, tap attach.
Lathe, 22"x12" Rahn-Larmon, quick change gear.
Lathe, 28"x10" Wolcott, d. b. g., q. c. g.
Lathe, 36"x18" L. & S., q. c. g., m. d.
Miller, plain, No. 4 Ohio, 72"x30"x20".
Nailing machine, No. 6 Morgan 8-track, m. d.
Pipe machines, 3" Jarecki, b. d.; 4" Williams, m. d.
Polishing stand, 3 h. p., U. S., 3/60/220.
Press, arbor 30 ton Lourie, Hydraulic.
Presses, o. b. l., No. 21 Bliss, 1" stroke (2).
Presses, o. b. l., No. 3 Thomas, 2600 lb., new, (2).

Press, 774 Bliss, T. R., 10" stroke, double back gear.
Press, D. C., No. 95-E Toledo, tie-rod, d. b. g., for m. d.
Press, No. 594 Toledo tie-rod, d. b. g., friction clutch.
Press, P-3 Ferracut motor drive.
Press or shear, United 38" shaft, m. d.
Pump, centrifugal 700 GPM., 4" disc.
Punch & shear, hand, No. 5 Buffalo.
Punch & shear, d. e. No. 46 Buffalo, 12" thts., 1-1/16"x8" triple gag punch and notcher.
Roll, bending, No. 10 K. & R., 2"x1" cap., b. d.
Punch and shear, No. 3 L. & A., 1"x1", 14" throat.
Riveter, No. 2A, Grant, cap. 5/16", for motor drive.
Riveter, Shuster, 3/16", belted.
Riveter, No. 120 Grant, capacity 8", motor drive.
Saw, No. 6 Marvel, g. b., m. d.
Saw, No. 10 Racine 9x9", belted.
Saw, cold, No. 7 Kesen-L, 15" belt.
Saw, cold, No. 1 Newton, 44" belt.
Saw, hack, 6x6" Peerless high speed, (2).
Saws, universal shaping, 6x6", motor drive.
Shaper, 21" Smith & Mills.
Shaper, 7" Rhodes, horizontal, on base, motor drive.
Shaper, 7" Rhodes, vertical and horiz., gear box, m. d.
Shaper, 16" Steptoe, cone or Turner Uni-Drive.
Shaper, 28" American, cone or Turner Uni-Drive.
Shaper, 24" Barker back gear V-rim, belt drive.
Shear, angle, 8x8x11/2" H. & J. motor drive.
Shear, angle, 8x6x11/2" Kling, motor drive.
Shear, rotary 22 Bliss 14 gauge.
Shear, throatless 18-M Marshalltown, motor drive.
Shear, bar 24" United, 24" blade, motor drive.
Slotter, 6" Newton, table 17".
Straightener, Gag., capacity 8" pipe, m. d.
Straightening mach., No. 2 Sutton, b. b., m. d.
Steam turbines, 100 horsepower 900 reversible (2).
Tearing machines 600 & 1000 lb. hand.
Truck, Cowan Transvayor 800 lb.
Valve sealer, Kwik-Way, cabinet base, motor drive.
Welder, Arc 300 amp, 3/60/220.
Wheel press, 60 ton 34"x8", belt drive.
Wheel press, 200 ton 93"x14" motor drive.

USED AND REBUILT MACHINERY

FOR SALE BY

Standard Machinery Co.,
347 Indiana Ave. Grand Rapids, Mich.

Automatic, 14" Gridley, model F.
 Boring mill, 42" Bullard vertical.
 Boring mill, 24" Lucas horizontal.
 Cold saw, 6" Higley.
 Drill, Baker 3" heavy duty.
 Drill grinder, Sellers 3" capacity.
 Grinders, No. 60 Heald Cylinder (2).
 Grinders, No. 2 LaSalle (2).
 Lathes, 9" Porter-Cable manufacturing (14).
 Miller, model C-1 Becker heavy vertical.
 Press, No. 6 Consolidated.
 Shaper, 15" Hendey, F. G.

FOR SALE BY

M. A. Wertman Machinery Co.
623 Penton Bldg. Cleveland, Ohio

Automatic, Gridley 44" single spindle.
 Automatic, New Britain 14x7, six spindle.
 Grinder, Heald, No. 70, power feed, c./s. drive.
 Grinder, Heald No. 85, hand feed, c./s. drive, (3).
 Hobbers, No. 3 Barber Colman, s. p. d.
 Lathe, Bridgeford 32" 14", taper attachment, m. d.
 Lathe, Reed Prentice 18"x16", taper attach., s. p. d.
 Miller, Brown & Sharpe No. 3A universal, s. p. d.
 Miller, Brown & Sharpe No. 60 hand.

FOR SALE BY

Denny & Clark
910 N. Marshall Ave., Chicago, Ill.

GENERATORS

500 kw. Ailis-Chalmers, Turbo-Generator, 3,600 r.p.m.
 200 lbs. steam pressure, condensing, 2,300 v., 3 phase,
 60 cycle, .8 P. F., direct connected exciter, switch
 board.
 150 kw. General Electric motor generator G. E.
 synchronous motor, 225 KV.-A., 2,300 volt, 3 phase,
 60 cycle, .8 P. F., Type AT1, direct connected to a
 G. E. type MPC-4 generator, 600 volt d. c. direct
 connected exciter, with all controls.
UNITS ARE IN EXCELLENT CONDITION

FOR SALE BY

H. F. Wolnick Machinery Co.
9 S. Clinton St., Chicago, Ill.

Boring mills, vertical, 36", 48", 96", 120", (5).
 Drills, radial, 24" and 4", (2).
 Keyseater Mitts & Merrill, No. 3.
 Lathes 15" swing to 30" bed, (10).
 Lathes, turning, pulley, 18" to 60", (5).
 Milling machines, (5).
 Planers, 24"x24"x6", 60"x60"x16", (2).
 Punch and shears, (3).
 Punch and shear, Cincinnati 7/16x10", m. d.
 Shapers, 16" to 24", (4).

FOR SALE BY

Scott-Bansbach Machinery Co.,

4607 West 20th St., Chicago, Ill.

Automatic screw mche., cone, 1", 4 spdl., b. d. \$1000
 Auto. screw mche., B. & S., Nos. 60, 9, 2, 3500 to 1150
 Automatic screw machine, Brown & S. No. 00G
 with slotter, No. 5931. 650
 Automatic screw mche., Brown & Sharpe No. 2
 Turret Former, cap. 1"x3" belt drive 500
 Automatic screw machine, Brown & S. No. 19
 high speed, capacity 1"x14" belt drive 400
 Automatic screw machine, Brown & Sharpe,
 No. 19 high speed, with motor. 500
 Automatic screw machine, Davenport, 1", 5 spdl.,
 belt drive. \$500 to 750
 Auto. screw mch., Gridley 4 sp. Model G & F 14" 500
 Automatic screw machine, Cleveland, Model A &
 B 1" to 34" belt drive. \$250 to 450
 Automatic screw mche., Cleveland 74" Model A
 belt drive, 13964 2350
 Miller, No. 6 Bristol, hand, 14"x44"x14" 125
 Miller, No. 1A Milwaukee, g. h., cap. 23"x8"x19" 600
 Miller, No. 14B Milw., g. h., cap. 23"x10"x19" 800
 Miller, No. 28 Ohio, plain, b. d., 28x10x13, vise. 600
 Motor, 20 h. p. G. E., 220 volt, 60 cy., 3 ph., 1145
 r. p. m., complete. 150
 Pipe machine, No. 308 Oster, 24" to 8" belt dr. 560
 Planer, 24x24x6 Ohio heavy duty, 1 head 350
 Planer, 30x24x7 Pond, heavy duty, 2 heads 450
 Planer, 72x72x12 Gray, 4 heads. 1,500
 Press, Stecher screw for dies, 1700 pounds 225
 Press, No. 3 Walsh o. b. i., 2" stroke, 22 ton capacity,
 2100 pounds. 250
 Press, No. 15 Robinson, horn type with table
 and motor, AC 220 volt 275
 Press, No. 51, Bliss, Arch, 1" str., 25 ton, 1800 lbs. 125
 Press, No. 51 Toledo arch, 24" str., 55 t., 5300 lbs. 350
 Press, Waterbury Farrell, straight sided, geared,
 8" stroke, 20 ton, 16" between. 450
 Press, D366, Ferracute, tog., 5" & 10" str., 160 t. 1090
 Press, Hercules, 15 ton, power forging or broach-
 ing, motor drive 300
 Punch, shear & bender, No. 23 Armstrong-Blum. 175
 Punch & shear, No. 52 Beloit comb. b. d., 1459 lbs. 175
 Punch, Kneeland, 10" throat, shears 5" x1" flat. 150

Riveter, No. 14B, High Speed Hammer, capacity
 1", motor shelf. \$ 100
 Riveter, No. 3A, High Speed Hammer, capacity
 1", with 1 h. p. motor, 220-60-3. 200
 Riveter, No. 4A, High Speed Hammer, 1" capacity,
 no countershaft. 200
 Riveter, No. 5A, High Speed Hammer, cap. 1",
 motor shelf. 275
 Riveter, Grant No. 82, 101A, 88 and 120, capacity
 1" to 1", belt drive. 50 to 125
 Roll feed, double, 54" stock, 2" str., from No. 21
 Bliss press. 75
 Saw, No. 2 Klem, band, for metal cutting, b. d. 200
 Screw machine, Acme, plain head, 1"x4" b. d. 125
 Screw machine, B. & S., No. 1 plain head, 1"x3",
 belt drive. 225
 Screw machine, Warner & Swasey, No. 2, plain,
 with air chucks and cylinders, (6), each. 250
 Screw machine, Foster, No. 5 geared hd., 14"x8",
 power feed, s. p. d. 500
 Screw machine, S & K, No. 4, friction hd., 14"x8"
 belt drive. 250
 Screw machine, Garvin, No. 3, friction head,
 14"x7", belt drive. 150
 Shear, Niagara, No. 05 circle, No. 18 gauge, cuts
 48" circle. 75
 Separator, McKinzie, for chips, blower type,
 belt or motor. 250
 Separator, No. 1 American, cap. 1 bushel, b. d. 75
 Separator, American, cap. 1 bushels, belt drive 250
 Shaper, 20" American, back geared, crank, vise
 and countershaft. 450
 Shaper, 24" Queen City, back geared, single pul-
 ley drive or motor drive. 750
 Tapper R. & S., 1" cap., horizontal, on pedestal. 75
 Tapper, Garvin, No. 2 automatic, capacity 1" and
 1" belt drive. 150
 Turret lathe, 24"x24", J & L, geared head, tools
 for bar work 250
 Turret lathe, 34"x36", J & L, geared head, with
 chuck for chuck work. 350

USED AND REBUILT MACHINERY

FOR SALE BY

Reliance Machinery Sales Company
1405 Brighton Place, N.S. Pittsburgh, Pa.

Air compressor, 1190 cu. ft. Ingersoll-Rand.
Drill, 3 spindle Foote-Burt, adj. head, No. 5 MT.
Boring mill, 42" Bullard, New Era type.
Drills, radial, 3", 3½", 4" and 5", tapping attachment.
Grinder, No. 2 Greenfield universal tool and cutter.
Grinder, No. 2 Brown & Sharpe surface, motor drive.
Lathe, 38" x 18" New Haven, cone head, cheap.
Miller, No. 4 Cincinnati, plain, cone.
Miller, No. 5 B. & S., plain, table 16" x 54", cone.
Planer, 36" x 36" x 12" Cincinnati, 2 heads.
Press, No. 6 Toledo, o. b. i., 5½" stroke.
Press, No. 58 Toledo geared, 7" shaft 8" stroke, high die space (26"); about 38,000 lbs.
Press, No. 97C Toledo, dbl. crank, 9" shaft, 72" wide, 3" stroke.
Press, Waterbury, open back, geared, 3" shaft, 5" stroke, weight about 4000 lbs.
Shapers, 16", 20" and 24", various makes.
Wire straightener & cut-off, 1" x 12" Shuster.
What do you need? What have you for sale?

FOR SALE BY

Nelson Machinery Co., Green Bay, Wis.

Boilers, used rebuilt, all sizes, power and heating.
Compressor, Ingersoll Rand 13x10 class E-R-1, with idler, unloader, and 50 HP S.I. R. mtr. and control.
Drill, rad., 4" Bickford No. 1, s.p.d., No. 5 Morse tap.
Generators, 300 k. w. Westinghouse, 3-60-2360-514 belted, bare, (2).
Planer, 3x30x8 Gray, belt drive, single head.

FOR SALE BY

Wigglesworth Machinery Co.

199 Bent Street Cambridge, Mass.

Boring mill, No. 21 Lucas horizontal.
Boring mill, 24" bar Cleveland.
Boring mill, No. 32 Gridley; Davis, 3½" bar.
Grinder, No. 3V Galmeyer Livingston, hyd. surface.
Grinder, No. 16" Blanchard, 96" chuck.
Lathe, 18" x 18" Monarch, timken bearing.
Lathe, 20" x 12" Monarch, geared head.
Miller, No. 3 Kempsmith universal.
Miller, No. 3 Cincinnati universal, hi power, rect. arm.
Miller, No. 5 Cincinnati plain, rapid traverse.
Shaper, 32" Hendey, vee ram, Timken bearing.
Send for Complete Stock List.

FOR SALE BY

Belyea Company, Inc.

150 W. 18th St., New York, N. Y.

GUARANTEED electric motors, generators, m. g. sets, transformers, frequency changers, gas eng. sets, rotary converters, centrifugal pumps, condensers, starting equipment. All sizes. Largest stock in the East. Prompt delivery. We also buy and exchange

FOR SALE BY

Russell Machine Co.

438 Oliver Bldg. Pittsburgh, Pa.

Boring mill, 84" Sellers, vertical.
Boring mill, 14/20" Niles ext. type vertical.
Boring mill, bor. N. B. P. 4½" bar floor type.
Press, 19 ton hand power traveling, 46" 8" span.
Generating set, 400 k. w., a. c. steam.
Hammer, 5000 lb. double frame NRP steam.
Lathe, 26" x 11" Wickes heavy duty, double back gear.
Lathe, turret No. 2-A W & S ser. above 125,000.
Lathe, 82" x 23" Pond triple geared.
Milling machine, plain, No. 3 Cincinnati.
Pipe cutting and threading machine 6" Merrill.
Planer, Cincinnati 36" x 36" x 10" table.
Press, wheel, 200 ton hydraulic, 45x100", motor drive.
Press, No. 20 Bliss, o. b. i., m. d. with motor.
Shaper, 24" Gould & Eberhardt.
Shear, alligator, United, cap. 5" square.
Shear, plate, L & A cap. 82" x 18".
Straightener, No. 1 Kane & Roach, cap. 3" rd. m. d.
Upsetting machines, 24, 34, 4 and 5" Ajax iron bed.
Welder, arc, 300 amp. Lincoln portable d. c.

WANTED:

**24"x96" to 144" Norton
Grinder to rebuild for
special purpose.**

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Fosdick 2½" S. P. D. thru gear box, \$500.
Fosdick 3" S. P. D. thru g.b., with suppl. tbl. 600.
Morris 3½" S. P. D. thru gear box, with tbl. \$600.
Mueller 4" cone drive 350.

GRINDERS

Gardner No. 6-26", b.b., m.d., disc.
Landis No. 2-Universal, Cyl.
Norton 10x50 Plain, Cyl.

ATHES

Seneca Falls 9"x4"-m g. c. g.
Pratt & Whitney 16"x7", g. c. g.
Sidney 15"x8" double back geared.
Monarch 18"x8" grd. hd., m.d., g. c. g.

Rockford 20"x10" h.d., d.b.g., g. c. g.

MILLERS

Kearney & T. No. 1½-B vert., s.p.d.
Kearney & T. No. 1½-B, No. 1-B,
No. 2-A, plain, dbl. overarm, s.p.d.
Brown & Sharpe, No. 3-B, s.p.d.
Kempsmith No. 11, plain, cone drive.
Hendey Norton No. 1½ Universal.

SHAPERS

Rhodes 7", Kelley 16", B. G.
Queen City 16", H. D., B. G.
Cincinnati, 20", B. G., M. D.
Cincinnati, 24", H. D., B. G.

PRESSES

Toledo No. 3 and No. 4, o. b. i.
Robinson No. 2, o. b. i.
Swaine No. 35, o. b. i.

Midwest Equipment Company

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Ingersoll Planer type Milling Machine with 40 H. P. motor, table 48"x22" 8", 2 hor. hds. for roughing, 2 hor. hds. for finishing.
Landis cyl. Grinder, 22" swing x 16" 6" bet. centers, self-cont., extra wheels, fixtures.
Chgo St. Press Br., 10" 6" bet. housings, 3/8" cap. m.d.
Bending Rolls, 12" Niles, 3/8" cap., Pwr. elev. drop end.

Real Buys in Presses

PRESSES, straight side, tie-rod fr.
No. 79 1/2 Bliss, 18" str., wt. 95000 lbs.
No. 59 3/4 Toledo, m. d., air cushion.
No. 310 Bliss, m. d., air cushion.
No. 58 Toledo; No. 305 Bliss, 8" str.

PRESSES, double crank
No. 94 1/2-E Toledo, m. d.
No. 8 Bliss, 120" bet. hsgs., air cush.
No. 23-J Bliss, overh. gap fr., 6" str.
No. 7-F Bliss, 96" between uprights:
Niagara No. 615, 62" between upr.
No. 96-G Toledo, 149" bet. uprights,
24" str., tie-rod, wt. 162,000 lbs.
Hyd. Watson S., 200 ton, 2-10" rams,

PRESSES, toggle
No. 409 Bliss, 60x109, air cushion.
No. 408-B Bliss, 84" bet. upr., 58x84.
No. 268 1/4-C Toledo, 108" bet. upr.
No. 795 1/2 A Toledo, 72" bet. upr.
No. 5S Bliss; No. 31 1/2-B Bliss

PRESSES, OBI
4-No. 6A Bliss, b. g., m. d.
No. 2 Am. Can.; No. 2 Rock.; No. 3 Nia.;
No. 5 Nia.; No. 4 Bliss; No. 5 Toledo;
No. 5 L. & J., B. G.

PRESSES, horn
No. 24 Bliss, swinging table.

PRESSES, Coining
No. 27K Bliss 1000 ton.
600 ton Waterbury-Farrel.

PRESS BRAKE, 10 1/3 x 8" Chicago Steel.
12" on bending die, m. d.

Other Desirable Tools

Angle Iron Shears, Coving., 6x4x3/8", dbl. end.

Automatics, Brown & Sharpe, late serial
No. 00G—serial No. 9900; No. 00—serial
No. 9800; No. 0G over 6700; No. 2.
Baling press, Galland & Henning, No. 10—
M.C., with triplex pump, operating valve.
Bending Roll, 10" 3/8" H. & J. 14" 10 Bertsch.
Boring mills, 36" Bullard New Era, with side
head, late serial numbers (2).
Boring mill, hor. 4 1/2" bar, m. d., rotary table.
Boring mill, 88" vertical.
Brakes, box & pan, 6" 10 ga. Chicago Steel.
Brakes, hand, 10" 14—8" 16, 8" 12.
Brakes, power, Chgo. Steel; 10" 10 ga.; 8" 1/4";
6" 12 ga. 12 1/4", pwr. clamp.
Bulldozer, Rock River Crosshead 32x5 1/2".
Drill, No. 242 Barnes Camel Back.
Drill, 6 spindle Edlund. power feed.
Gang Slitter, 36" Yoder, m. d., levelling rolls.
Grinder, Landiscyl., 22" sw., 16 1/6" bet. centers
Grinder, No. 25 Heald Surf. 16" mag. chk.
Hammer, drop, 400 lb. Standard.
Hammer, No. 2A, No. 3A Hi-Speed.
Hand millers, No. 2 Kent Owens (4).
Ironworker, Univ., Schatz, 6x6 ang., 3x3 Smith.
Lathes, South Bend, 9x3 1/2"; 16/24 gap.,
m. d., q. c. g.
Lathes, 30"x16" L&S, t.a., 26" Bradford.
Lathe, 36"x30" L. & S., 24" centers, q. c. g.
Lathe, 48"x18" Schumacher & Boye.
Lathes, spin., Prybil 22", bb.; Tol. 30" bb.
Miller, No. 3 Kempsmith univ., m. d. with DH.
Millers, Pl. & Vert., No. 3 Inger. 14x48 tbl.
Millers, Pl., No. 3B No. 1A K. & T., dbl. over.
Millers, Univ., No. 2A B. & S., div. hd., m. d.
Nibblers, Campbell No. 1 & 1B, m. d.; No. 2.
Planer, 26"x8" Cleveland, open side.
Planer, 60x60x18 N. B. P., 4 hds., m. d.
Planer, 36"x12" Liberty, box table, m. d.
Porcelain Vitreous Enameling Furnace.
Press Brake, 10" 10 ga. OHL, excel. condition.
Saw, Friction, No. 1, No. 0 Ryerson & No. 2.
Radial Drill, 6" American; 5" Fossdick.
Roller leveller, 48", 17 rolls, motor drive.
Screw Mch., auto., No. 506 New Brit. 6 sp.
Screw mach., auto., 4 spdl. Gridley, 1 1/4" cap.
Shapers, 20" Queen City; 16" & 24" Gould & E.
Shaper, 24" Ohio Dreadnaught, tilt top tbl.
Shear, 16 1/3 x 16", Long & Allstatter.
Shear, power, 10 1/2", 10 1/2", OHL.
Shears, throatless, 10 ga. 1/2".
Shears, power, 13 1/2" 8 1/2" Bertsch; 6' 10 ga.
Shears, rotary Quickwork, No. 25, 30" throat,
32" cap.; No. 10, 60" throat, 14 gauge.
Turret lathe, No. 4A & 2A W. & S. univ.
Welders, spot, 100 KW. Federal press type,
m. d., 5, 7 1/2, 10, 25, 50 KW.
Welders, Butt, 10 KW Thompson 5KVA Taylor.

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SPECIALS

No. 2 Williams & W. Bender & Straightener.
1B Foster Geared Head Turret.
10'-3/16" Apron Brake Robinson, M. D.
10' Drop End Bending Rolls, 1/2" capacity.

60"x36"x10' Hamilton Planer.
42"x42"x14' Woodward & Powell Planer.
No. 2 Brown & Sharpe Surface Grinder.
26" Cincinnati Traveling 2 Head Shaper.

Air compressors, 30' to 2000'.
Bolt threader, 2" Nat. 1 head.
Bolt threader, 2 heads, National 1".
Boring mill, 36" King turret; 60" Colburn 2 heads.
Boring mill, 44" Niles, vertical, 2 heads.
Boring mill, 6-12" Betts, vertical.
Boring mill, horizontal 4 1/2" bar Betts knee type.
Boring mill, horizontal, Barrett, 6" bar.
Broach, Nos. 3A and 3B LaPointe.
Drill, radial, 4" Drees; 4" Bickford.
Drill, 4 spindle Rockford 20" b. g. & p. f., taper attachment and automatic return.
Drills, 25 various, upright.
Drills, Colburn D4.
Gear cutters, No. 3 Adams hobber.
Grinder, 6x18" Ott; 10x14 Landis; 8x18 Mod.
Hammers, Drop, various sizes.
Hammer, 200 lb. and 75 lb. Bradley.
Hammer, steam 4000 to 250 lb.
Lathe, 18"x8" Boye & Emmes.

Lathes, 15, various sizes.
Lathes, turret, No. 3 and 7 univ. Bardons Oliver.
Lathe, 24x14 L. & S. pat. head.
Lathe, 36" H. S. & G. heavy duty.
Lathe, turret, No. 6 Woods, tilted.
Miller, 2 1/2 Rockford universal and vert. hd., s. p. d.
Miller, No. 3 B. & S., plain.
Miller, Pratt & Whitney spline.
Miller, No. 4 Brown & Sharpe, plain.
Press, No. 2, 3 and 4 Marshalltown, o. b. i., new.
Presses, hydraulic up push 16" dia. piston 38x28 bolster and pump.
Punches and shears, structural all sizes.
Saw, No. 14 Hgley.
Saw 12"x12" Racine.
Shaper, 16", 20" and 24".
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200 electric motors and generators.
Gas oil, and steam engines.
1000 other tools available.

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VERTICAL BORING MILLS

10-ft. Cincinnati Massive Pattern, Pwr. Rapid Traverse, 2 swivel heads, Motor Drive.
100" Niles-Bement-Pond; 2 swivel heads; Power Rapid Traverse; Motor Drive.
84" Cincinnati, 2 swivel heads, Power Rapid Traverse, Motor Drive.
72" Gisholt, 2 swivel heads, Power Rapid Traverse, Motor Drive.
60" Gisholt; 2 swivel heads; Power Rapid Traverse; Motor Drive.
48" Colburn, 2 swivel heads, S. P. D.
42" Bullard, 2 swivel heads, S. P. D., P. R. T.
36" Bullard, 2 swivel heads, Belt Drive.
42" King, 2 swivel heads, Power Rapid Traverse, Motor Drive.

LATHES

28"x10" Hende, Belt Drive.
28"x17" Houston, Stanwood & Gamble, Belt Drive.
28"x20" Walcott, Belt Drive.
24"x12" American Geared Head, M. D.
12"x8" L. & S. Belt Drive, Taper Att., Collets.
18"x8" Reed Prentice; M. D.

GRINDERS

No. 13 Brown & Sharpe Universal & Tool; No. 3-V Gallmeyer & Livingston.
No. 3-V Gallmeyer & Livingston Vertical Spindle Surface; Magnetic Chuck; Motor Drive.
No. 3 Wilmarth & Morman Surface.
No. 65 Heald Internal.
No. 3 Bryant Internal.
No. 14 Gardner Disc, Ball-Bearing.
No. 1 Fraser Universal Tool and Cutter.

AUTOMATIC SCREW MACHINES

27" & 28" Gridley Model "G" 4-spindle.
14" Cone 4-spindle.
No. 2 Brown & Sharpe.

MILLING MACHINES

No. 2-B Brown & Sharpe Plain, Motor Drive.
No. 2VB Brown & Sharpe Plain, Motor-in-Base.
Nos. 3 Cincinnati Plain; Cone Drive.
No. 15 Garvin Vertical.
No. 2 Kempnath Universal, Belt Drive.
4" Pratt & Whitney Spline.

TURRET LATHES

No. 2A Warner & Swasey Hollow Hexagon Universal; Chucking equipment.
28" Libby, 74" hollow spindle, Motor Drive.
28" Libby, 44" hollow spindle, Motor Drive.
No. 8 Foster Geared Head, 21" hollow spindle, S.P.D.
3"x36" J. & L., with Bar & Chucking Equip., S. P. D.

RADIAL DRILLS

6" Cincinnati Bickford, Motor Drive.

SHAPERS

25" Smith & Mills, Motor Drive.
6" & 10" Pratt & Whitney Vertical.

MISCELLANEOUS

Drill Press, 4-spindle Edlund Ball Bearing, M. D.
Hammer, 300-lb. Bradley Upright Helve.
Oil Groover, Fischer, Motor Drive.
Open Side Planer, 84"x84"x18" Detrick & Harvey, 2 rail and side head-auxiliary housing with 4th head, Motor Drive.
Press, 50-ton Lucas Forcing.
Shear, No. 662 Niagara Squaring, capacity, 10 ga., cutting length 64", 15" gap, Motor Drive.

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36 Van Vechten St.
NEWARK, N. J.

EMCO REBUILT MACHINE TOOLS

BORING MILLS

- 37" Niles, m.d., 2 heads.
- 40" King, 2 heads, p.r.t.
- 42" Bullard Rapid Production, 2 swivel heads.
- 42" King, m.d., 2 heads, p.r.t.
- 60" Gisholt, variable speed m.d., 2 heads, p.r.t.
- 60" Gisholt, m.d. thru gear box, 2 heads, p.r.t.
- 72" Bullard, cone, 2 heads.
- 72" Niles, cone, 2 heads.
- 62" Niles Heavy Pattern, m.d., brand new, 2 heads, p.r.t.
- No. 1 Cleveland Horizontal, s.p.d., 2½" bar.
- No. 2 Niles-Bement-Pond Horizontal, m.d., 3½" spindle, brand new.
- No. 4 Niles-Bement-Pond Horizontal, m.d., 5½" spindle.

MILLING MACHINES

- No. 2B Milwaukee Plain, double overarm.
- No. 3 Cincinnati Plain, rect. overarm.
- No. 2, 3, 4 Cincinnati Plain, round overarm.
- No. 1½, 2, 3, 4, 5 Cincinnati Plain, cone.
- No. 1, 2 Cleveland Plain, s.p.d.
- No. 2H Brown & Sharpe Plain, cone.
- No. 3 Kempsmith Plain, cone.
- No. 4 Kempsmith Plain Maxi-Miller, m.d. in base, National Standard Spindle, ball bearings.
- No. 13R Brown & Sharpe Plain, s.p.d., National Standard Spindle.
- No. 3 Cincinnati Universal, s.p.d.
- No. 2 MU Garvin Universal, cone.
- No. 2 Rockford Universal, s.p.d.
- No. 4B, 5, 6 Becker Vertical, cone.
- No. 22 Garvin Vertical, cone.
- 48" Cincinnati Automatic Duplex Miller, m.d., worm driven.
- 48" Cincinnati Plain Automatic, m.d., worm dr.
- No. 33 Kempsmith Mfg., s.p.d.
- 6x80" Pratt & Whitney Thread, belt.
- 24" Cincinnati Plain Automatic, m.d., National Standard.
- 24" Cincinnati Duplex Automatic, belt.
- 24" Cincinnati Duplex Automatic, m.d.
- 24" Cincinnati Duplex Automatic, widened pattern, m.d.
- 48" Oesterlein Tilted Offset, m.d., National Standard Spindle, Tinken Bearings, latest type.
- C66A Newton 3 spindle Continuous Miller, s.p.d.

SHAPERS

- 15" Potter & Johnston Universal, m.d.
- 16" Cincinnati, m.d. gear box.
- 20" Queen City, cone.
- 20" Smith & Mills, cone.
- 20" American, auto oiled, m.d., vee ram.

ENGINE LATHES

- 12"x6" Hendey Geared Head, taper.
- 14"x6" Hendey Geared Head, taper.
- 16"x6" Hendey Geared Head.
- 16"x6" Hendey Yoke Head.
- 16"x6" American, bowl head.
- 16"x8" American Geared Head.
- 16"x8" Prentice Geared Head.
- 17"x8" Sidney, cone head.
- 18"x8" American, bowl head.
- 18"x8" Prentice Geared Head.
- 18"x10" Lodge & Shipley Patent Head.
- 18"x10" Prentice Geared Head.
- 20"x6" Hendey Geared Head.
- 20"x8" American Geared Head, 12 speed, taper.
- 20"x8" American Geared Head, 8 speed.
- 20"x9" Lehmann Geared Head, 16 speed, taper.
- 21"x8" LeBlond Geared Head.
- 24"x8" Hendey Yoke Head, taper.
- 24"x10" Greaves-Klusman cone head.
- 24"x11" Chard, cone.
- 24"x11" Boye & Ennes, 12 speed, taper.
- 24"x20" LeBlond, Tinken Bearings.
- 24"x20" LeBlond, cone.
- 25" raised to 32"x12" LeBlond, cone.
- 27"x12" Prentice Geared Head.
- 27"x16" American Geared Head, 12 speed, like new.
- 30"x11" American, cone.
- 36"x11" American, cone.
- 36"x12" Bridgeford Geared Head, taper.
- 36"x18" Niles, cone.
- 36"x28" American Geared Head.
- 36"x29" Johnson, cone.
- 36"x33" Niles, var. speed m.d.

HEAVY DUTY DRILLS

- 36" Cincinnati Bickford, m.d.
- 40" Aurora, brand new, cone.
- 12, 13, 14 Colburn.
- No. 4, 22 Colburn Mfg.
- No. 14 Colburn H.D.
- No. 217, 310, 314, 315 Baker H.D.
- No. 216, 220 Baker 2 spindle.

GEAR MACHINERY

- No. 6, 61, 615 Fellows.
- No. 7 Fellows H.S.
- 11" Gleason Revel Gear Generator.
- No. 3, 12 Barber-Colman.
- No. 12 Barber-Colman Double Overarm.
- No. 30BM Gould & Eberhardt 3 spindle Gear Rougher.
- No. 3-36", 3-36", 4-48" Brown & Sharpe Gear Cutters.
- No. 5A Lees-Bradner, 14" size.
- 16" Cincinnati Gear Hobber, m.d.
- No. 16HS Gould & Eberhardt.
- No. 18HM 2 spindle Gould & Eberhardt.
- No. 34 Brown & Sharpe Gear Hobber, m.d.
- No. 44 Brown & Sharpe Gear Hobber, m.d.
- Schuchardt & Schutte Gear Tooth Rounder.

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BORING MILL, Horizontal Defiance $4\frac{1}{2}$ " bar, Motor Driven.
GRINDER, No. 33 ABRASIVE SURFACE MOTOR IN BASE.
GRINDERS, No. 2, No. 3, No. 13 Brown & Sharpe Universal.
GRINDER, No. 16 Blanchard 30" Magnetic Chuck Belted Motor Driven.
HOBBER, Gear No. 16 Hi-Speed Gould & Eberhardt.
LATHES, Turret No. 1A, No. 2A, No. 6 Geared Head, Warner & Swasey, Motor Drive.
MILL, No. 35 Cincinnati Vertical, Dividing Head, Single Pulley Drive.
MILL, No. 2 Brown & Sharpe Vertical Motor Drive.
NIBBLER, Gray 34" throat $3/16$ " capacity.
PLANER, 36"x36"x14' Liberty 3 heads, Box Table, Motor Driven.
PLANER, 60"x60"x12' Niles Hement Pond Box Table.
PRESSES, O. B. I. No. 5 Niagara Motor Drive 3" Stroke 95% New, (3).
RADIAL, American 3' Sensitive Hi Speed, Motor on Arm.
RADIAL, American 5' Triple purpose, Motor Driven.
SHEAR, No. 2132 Stoll, 132" 14 gauge capacity Motor Driven.
SHEAR, 72" 1 5/8" capacity Bliss Motor Driven.
SLOTTER, 16" Bette Motor Driven, Latest Type, Rapid Traverse.
TAPPERS, National Bent Shank, 1/2" Capacity.
WELDERS, SPOT, SEAM & BUTT, 100 to 200 KVA Projection.

And a complete stock of fine up to date machine tools and equipment.

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DRILLS

No. 2 Avey, arr. m. d. 12" overh.
No. 2, 4-spindle Aveyomatics.
1, 2, 3, 4 & 5 sp Allen, h.s., b. b.
3 spdl. Allen No. 2 M. T.; p. f.
4 spindle L-G No. 2 M. T.; p. f.
26" Barnes, sldg. head, tap. att.
5' Dresser Univ. rad., arr. m. d.
No. C-5 Natco, 10 spindles.

GEAR HOBBERS

No. 12 B-C double overarm.
No. 3 Barber Colman, m. d.
No. 1/2 Schuchardt & Schutte.

GRINDERS

12"x36" Thompson, univ., m. d.
No. 2 Norton univ. tool & cut.
No. 2 Gardner disc, 18", disc pr.
No. 4 Gardner disc, 20", disc pr.
No. 85 Heald int., m. d.
No. 72 Heald int., hydraulic.
No. 25 Heald, hyd. rotary surf.
No. 20 Heald rotary surface.
Nos. 1-2-3 B. & S. univ., 3 mtrs.
No. 11 Brown & S. plain, m. d.
No. 2 B & S surf., m. d. & b. d.
No. 2-1 B. & S. universal, m. d.

LATHES

14"x6" Hendey, q. c. g.
14"x6" LeBlond, q. c., t. a.
15"x6" C. & J. c. hd. q. c. g., new.

16"x6" C. & J., grd. hd., Timken
Bearing, motor in base, new.
16"x6" South B., q. c. g., t. a.
16"x8" South Bend, q. c. g.
16"x8" Monarch grd. hd. Timken
Bearing, Taper Attach.
16"-24"x10" S. B. Gap, q. c. g.
18"-26"x8" S. B. Gap, q. c. g.
18"x8" Hendey, q. c. g.
18"x8" B. & E., q. c. g., t. a.
20"x9" Hamilton, q. c. g.
20"x10" Schu., Boye & E., q. c. g.
24"x12" Schum. B. q. c. g., t. a.
28"x11" Hamilton q. c. g., t. a.
32"-44"x16" Schu. B. q. c. g.

MILLING MACHINES

No. 1B, K. & T. univ., s. p. d.
No. 2, Van Norman Sub Head.
No. 2, B. & S. Plain, cone head.
No. 2Y, B. & S. Pl., mtr. drive.
No. 2A B. & S. Univ. motor dr.
and s. p. d.
No. 2B, Brown & S. plain, m. d.
No. 6 Whitney hand, motor dr.
4 1/2"x12" Pratt & Whitney thrd.
No. 2 1/2 Rockford universal.
Model "B" Becker, h. p., vert.
No. 4B Becker, vert., b. b., spdl.
No. 1M Cincinnati, vert., s. p. d.

PRESSES

No. 4A Bliss horn., 4" stroke.
No. 13 Toledo Grd. horning.
No. 1 & 1 1/2 Bliss Cam Dr., grd.
No. 6 Fox "Superflex".
No. 1 to 8 Rockford o. b. i. new.
No. 1 Loshbough J. o. b. i.

SHAPERS

16" Gould & Eber., b. g. crank.
20" G. & E. & Milw., b. g. crank.
20" Cincinnati, b. g. crank.
24" Milwaukee b. g. crank.
24" Amer. & Stock, motor dr.

MISCELLANEOUS

Bolt Cut., 2 1/2" Landis Lead Scr.
Broach, No. 3XA Oilgear Hyd.
Die filer, No. 3 Bearwin, m. d.
Die filer, No. 3 Thiel, motor dr.
No. 2 Grant Riv. Ham., 1/4" cap.
No. 6 B. & S. auto. screw mche.
No. 11 B. & S. hand screw, m. d.
Keyseater, No. 0 Baker, 1" cap.
Keyseater, No. 2 Davis, 1/2" cap.
Planer, 48"x48"x20" Liberty, o. s.
Saw, 9x9" Peerless, high speed.
shaping, motor drive.
Saw, 9x9" Peerless, high speed.
Tapper, No. 1 Garvin, b. b., m. d.
timken bearing.
No. 3A Univ. Hor. Boring Mill.

GEO. M. BERNSTEIN & CO.,

12 So. Clinton St.,
CHICAGO, ILL.

Good Used Machinery

- AIR COMPRESSORS;** Curtis 9x9 dbl. cyl. vert.; 12x12 horiz. (Bury).
BORING MILLS; Niles 36" c. d. Baush 44" m. d. N-B-P 54" s. p. d. Vert. with 2 heads; Barrett 5" bar c. d. horizontal; Bullard 51" Vertical 2 heads; Colburn 60" vertical. 2 heads.
BRAKES; D & K 10' 10 GA. M. D. & D & K 10' 16 GA. Hand.
CUT-OFF MACHINE, Davis 6" cap. (3) & Etna 2" cap.
DRILLS (RADIAL); Mueller 2½', Fosdick 2½', Prent. 3'; Carlton 4' all gear box dr.; Hammond 4' sensitive; Amer. 2½" M. D. gear box.
DRILLS (H. S. B. B.); H & W 2, 4, 5-sp.; Allen 2 & 6-sp.; Avey, Demco. Lel-Giff. 1-sp.; Avey 2-sp.
DRILLS (MISC.); Baker No. 217 (2) & No. 314 Hvy. Duty; Hamilton 42" S.H.; Barnes 26" S.H. tap. attach.; Barnes 20" & 24" 1-sp. & 20" 4-sp. & 24" 3-sp. all grd. camel back; P & W No. 12 Multi-Sp.; Natco 20-sp.
GEAR CUTTERS; G & E 36", G & E 48", G & E 60" & B & S 26" s. p. d. automatic spur; Fellows 36" gear shaper. Cincinnati 36" gear cutter.
GRINDERS; P & W 12" vert. surf.; Cin. No. 1½ & B & S No. 12 univ. tool, B & S Nos. 11 & 16 plain, Heald Nos. 60 & 65 Int.; B & S No. 13 Univ. & Tool; Landis 10x30" Plain; B & S 10x48"; 4—Norton 6x32" plain, Heald No. 20 Rotary Surface (3). B & S No. 2 Univ.; Diamond No. 2 surface; Badger No. 220, auto. d.e., opposed disc (4); Webster & Perks No. 2 Univ.
HONING MACH.; Hutto 2-spindle Vert. M. D.
KEYSEATER; Mitts & Merrill No. 5 vert. & Davis No. 1 vert.
LATHES; Reed-Prent. 16"x8' grd. hd.; LeBlond 18x8'; Lehmann 18"x9'; Amer. 22x8'; Whit. Blais. 22"x8'; Davis 22"x10'; L & S 20"x10'; S-B & E 20"x10' q. c. g.; Flather 22"x10', Schumacher-Boye 24"x14'.
MILLING MACHINES; Van Norman No. 2 duplex; Ohio No. 29 Univ.; Kemp No. 3; B & S No. 3; Cleve. No. 1 s. p. d. univ.; B. & S. No. 2; Amer. No. 1½; Cin. No. 3; B & S No. 3; Hendey No. 3; LeBlond No. 3; Mil. No. 3-B & Cinc. No. 3 s. p. d. pl.; Becker Model "B" & No. 6 vert.; Kemp. No. 33 s. p. d. Prod.; Ingersoll slab, m. d. 33", table 30½"x16"; LeBlond No. 4 m. d. pl.
PIPE MACHINES; Landis 12" A.C., m.d.; Landis 2" m.d.
PLANERS; Gray 30"x30"x10' 2 heads; Flather 24"x24"x6"; Gray 28"x28"x6' 1-hd.
PUNCH PRESSES; Bliss No. 19 o. b. i.; Toledo No. 3 o.b.i.; Federal Nos. 1, 2, 3 and 4 o.b.i.; R. & K. No. 3 o.b.i.; Bliss No. 62 geared; Ferracute No. P-4, Bliss No. 65-N, 68-N dble. action; Toledo No. 52 arch; Fer. No. EGF 52 Coining; Swaine No. 33; Niagara No. 4½; Willard No. 4-A o.b.i.; Swaine No. 38 arch, geared; Emco, Swaine No. 27 bench presses.
SAWS (HACK); Racine 6x6" H. S. (4); Peerless 6x6" M. D. Univ. Shaping (2).
SHAPERS; S & M, G & E, Ohio, Mil., Q. City, Davis, Cin. 16"; Ohio & G & E 20"; S & M, Q. City, Rock, 24"; Ohio 26"; Cin. 24" s. p. gr. box; Rhodes 3½" Vertical; American 24" heavy, b.g. Amer. 15".
SCREW MACHINES; W & S No. 4 & No. 6 Hand; Nat. Acme. Nos. 515, 52, 55, & 56 4-sp.; Gridley 4-sp. ¾"; Automatic, B & S No. 00 auto.
TAPPING MACHINES; (2) Garvin No. 2 Vertical Automatic & Garvin No. 1.
THREAD MILLER; Moline No. 10; Lees-Bradner No. 4 & No. 3, (2).
TURRET LATHE; Bullard 36" vertical, rapid production. Bausch 24" M.D.

Above is only small part of our large stock on hand.

McDONALD MACHINERY CO.

1531-35 No. Broadway

ST. LOUIS, MO.

Guaranteed MACHINE TOOLS

VISIT US AT OUR NEW AND LARGER QUARTERS

This Is Partial Listing. Pictures of Machines Listed Sent on Request.

GEAR MACHINES

No. 40 Cross Hydraulic Gr. Pointer.
2-5-AC Lees-Bradner Gr. Hobbers.
2-4x36 Brown & Sharpe.
No. 12 Barber-Col sgl. & dbl. overarm.

DRLS AND RADIALS

21st, 24th & 36th Cin. with and without tapping attachment.

H. S. drills, 1, 2, 3 & 4 spdl., hand and power feed, Leland & Gifford, Fordick, Edlund, Avey, etc.

D3 Colburn single spindle.

No. 2 I. & G. motor in head, adj. for drilling on angles.

4th Cincinnati Radial, Motor Drive.

4th Hammond Radial Jack-Knife Type, tapping attachment.

Nos. 216 and 217 Baker Drills, M.D.

Cl3H Natic hydr., drilling area of hd.

16th x 20th, head bored for 24 spindles.

No. 13 & 14 Natic mult. rect. head.

PUNCH PRESSES

8-ton General Flexible Power Press.

No. 4 Cons. O.B.I. b. dr., 3rd stroke.

No. 4A Bliss Homing, without table.

No. 36 Nis., flywheel in bk., arr. m.d.

MILLING MACHINES

No. 2B Brown & Sharpe Plain, M.D.
18th, 24th & 48th Cin. duplex, std. and widened pat.

Type B Godley & Edlund Production.

No. 15 Garvin Vertical.

No. 2 Standard Milw., motor in base.

GRINDERS

No. 33 Abrasive, magnetic chuck.

No. 70A Head Internal, 3 motors.

No. 3 Wilmarth & Morman Sur. B.D.

Cin. face mill, cap. 24th diam, M.D.

No. 70 Head Int. belt & motor drive.

84A Gardner Disc, 2 opposed wheels.

64th Diamond Face, M.D.

No. 10 & No. 11 B & S, Pl., M.D.

Fitchburg semi-automatic Spindle shaft.

SCREW MACHINES AND AUTOMATICS

No. 2A Warner & S. Univ., Serial

No. 197,000, 3 Jaw Air Chuck.

No. 4 Warner & S. Univ., C. D.

7/8th Model G Gridley, 4 spdl, m.d. (2)

No. 4 Brown & Sharpe Hand.

No. 6 Warner & Swasey Power feed to turret and cross slide.

Cleveland Model 7/8th to 1 1/8th, 4 spdl.

with mag. feed, M. D.

4 1/4 Single Spindle Gridley.

MISCELLANEOUS

Butt welder, Federal, 75 kw., 60 cy.,

3 ph., 440 v., 3/8th tubing capacity.

Boring mills, No. 41 & 43 Lucas, horiz.

Dividing hd, 12th Cinc. univ., with gra.

Filing machine, No. 3 Thirl.

Hammers, No. 4-A & 5-A high speed.

Honing machine, Footbust, sgl. spindle.

Jig bores, No. 2 & No. 3 Pratt & W.

Lathe, 16th x 8th Monarch, g. h., m. d.

Lathe, 17th LeBlond Prod., g. h., m. d.

Metal band saws, Nos. 1 & 2 Klemm.

Planer, 60th Cleve. open side, 3 hds.

Saw, cold, 4-B Chchran & Bly.

Shapers 20th American, m. d., (3).

Shear, 8E Niag., 3/16th cap., m. d.

Swedging machine, No. 5 I angelier.

Tire press, 150-ton hydraulic.

International Machinery Company

3131 East Jefferson Ave.,

Detroit, Michigan

REASONABLY PRICED TOOLS

PRESS, No. 305 Bliss, straight side, back geared, steel tied frame, 5th stroke.

AUTOMATICS, Several Model A Clevelands, from 5/8th to 3/4th bar capacity.

BOLT CUTTER, 1 1/4th Acme single, class A; 2nd Landis.

DRLS, 36th Cincinnati back geared, sliding head, tapping attachment.

N. D. 31 Fox multiple drill 16x32 head, 10-1 1/4th apindles, belt drive.

24th Edlund Production 1 1/4th cap. power feed; No. 12 Minster H. D.;

2—Spindle 20th Barnes All Geared Self Oiling M. D., 24th Barnes all geared.

3—Spindle 20th Barnes All Geared Self Oiling belt drive; No. 314 Baker heavy.

GRINDERS, 14th x 72th Norton Plain; 12th x 72th Landis M. D.; No. 78 W' & M. Surf. M; D.

LATHES, 38th x 14th Fifield—Cheap; 18th x 8th Greaves-Klusman double b. g., quick change.

MILLERS, No. 2B Brown & Sharpe plain, single pulley drive; No. 6 Becker Vertical with

ball bearing countershaft; No. 3 Milwaukee Plain, Timken Bearings, Vertical Head,

Rapid Traverse, Motor in Base; No. 1/2 Van Norman, 8th P & W Automatic.

No. 1 1/2 Cincinnati plain; No. 13 Garvin, index centers.

PLANERS, 30th x 30th x 8th Cincinnati, two heads on rail; 36th x 15th Betts, 2 heads.

PRESSES, O. B. I.—No. 105 Bliss Consolidated, dbl. crk. incl., flywh. type, arr. for motor.

No. 2 Rockford 3rd stroke; No. 3 and 4 Walsh; No. 2 1/2 Robinson.

No. 72 Atlas power screw press, 36th between col, 30 ton cap.

RADIAL DRILL, 3rd Prentice, gear box drive; 3rd Cincinnati Bickford gr. box drive.

SCREW MACHINES, No. 4 Warner & Swasey univ. cone head, also plain screw machine.

No. 1 Brown & Sharpe wire feed; No. 4 Milholland.

Many other tools—exceptional "buys"—write for full details.

A. D. White Mchy. Co., 108 N. Jefferson St., Chicago, Ill.

MILES' QUALITY TOOLS

AUTOMATICS

- 1½" & 1½" cone.
- 1½" & 3½" Gridley.
- 5½", 1", 1½" & 2" Cleveland.
- Nos. 24, 33, 34, 454, 634 New Britain.
- No. 5A, 6A Potter Johnston.
- 14" Fay.
- 8" & 12" Bullard Multaوماتics.
- 10" Bullard Continumatic.
- 18" Gisholt Simplimatics.

BROACHES

- Footc Burt vertical surface.
- No. 28 Lapointe hydraulic.
- 10 ton Metalwood hydraulic.
- 15 ton Oilgear hydraulic.
- No. 3 Oilgear hydraulic.
- No. 3 American rack.
- No. 3 J. N. Lapointe double.
- Nos. 0, 3, 4 Lapointe.
- 2 ton American vertical.

DIAMOND BORERS

- No. 112 A Excello 2 spindle.
- Coulter 1 & 2 Spindle vertical.

DRILLS

- 21", 24" & 28" Cincinnati.
- 20", 22", 24" Barnes all geared.
- 24" Barnes 4 spdl. all grd.
- 30" Snyder.
- Nos. 216, 217, 315, 321 Baker.
- No. 2 Mfg. Colburn 1, 2, 3, 4 spdl.
- Natco Multiple, C12, 14, B14 & 30.
- Nos. 1 & 3 Bausch multiple.
- No. 1 Pratt & Whitney gun.
- 6 spdl. Pratt & Whitney deep hole.
- Nos. 6D, 11D & 16D Moline.
- No. 10D Moline cylinder borer.
- 5 spdl. Detroit automatic.
- Nos. 15½" & 17 Foote Burt.
- 2½" Morris radial.
- 3" American sensitive radial.
- 3" Dresses radial.
- 3" Cint. Bick. radial.
- 3½", 4", 5" and 6" Western radial.
- 4" Mueller radial.
- 4" Hammond radial.
- 6" N.B.P. univ. radial.

- Sensitive:—Avey, Leland Gifford, Allen, L. G., H. & W., etc., 1 to 6 spindles, sizes No. 1 to No. 3.

FORGING TOOLS

- Nos. 8 & 25 W. & W. bulldozers.
 - No. 5 I Nasel hammer.
 - No. 1A Ajax force rolls.
 - 1" National upsetter.
 - 1", 1½" & 4" Ajax upsetters.
 - 1½" Acme upsetter.
 - ½" No. 3 W. F. cold header.
- ## GEAR CUTTERS
- No. 12 Barber Colman.
 - Nos. 12HS, 18H & 24H G. & E.
 - Nos. 6, 77A & 715 Fellows.
 - Nos. 1 & 5A Leas Bradner.
 - 28" G. & E. spur & bevel.
 - 36"x10" Newark automatic.

- Nos. 3 & 4 B. & S. auto.
- 6" & 11" Gleason bevel.
- 1Lpe 2-spdl. chamferer.
- Gleason quenching press.
- No. 2 Bilton gear miller.

GRINDERS

- No. 2 Cincinnati centerless.
- No. 2 Heim centerless.
- No. 72A3 Heald Sizematic.
- Nos. 70 & 72 Heald internal.
- No. 12 Bryant internal.
- No. 3 Barber Colman hob.
- 16"x32" Norton crank.
- 16"x48" Landis crank.
- No. 4 Brown & Sharpe univ.
- No. 1 Bath universal.
- No. 16 Blanchard surface.
- 6"x18" No. 2 B. & S. surface.
- 6"x36" Norton surface.
- 8"x20" Wil. & Mor. surface.
- 12"x46" Springfield surface.
- 30"x50" Safety Emery surf.
- 30"x84" Diamond face.
- 18", 24" & 30" Gardner disc.
- Nos. 8, 220 & 221 Badger disc.
- 24" No. 84 Gardner opp. disc.
- 30" No. 96 Gardner hydr. face.
- 8" Arter auto. piston ring.
- 12" Arter rotary surface.
- Landis:—6"x18" to 16"x53".
- Norton:—6"x32" to 14"x72".

ENGINE LATHES

- 14"x6" & 16"x6" Monarch.
- 16"x8" & 16"x10" Lodge & Shipley geared head.
- 18"x6" & 20"x8" Hendey, taper
- & relieving att'n't.
- 20"x10" Reed Prentice grd. hd.
- 21"x18" Leblond heavy duty.
- 22"x10" Davis.
- 24"x16" Schumacher Boye.
- 26"x12" Wickes.

LATHES, TURRET

- Nos. 2, 2A, 3A, 4 & 6 W. & S.
- Nos. 1B, 3 & 4 Foster.
- 18" Libby.
- 21" & 24" Gisholt.
- 24" & 42" Bullard vertical.

LATHES, MFG.

- 8" Sundstrand stub.
- 11"x4", 11"x6", 17"x6" Leblond.
- 17"x8", 20"x8" Wickes.
- 13"x6" Automatic threading.
- 26"x10" Leblond crankshaft.
- Nos. 9 & 12 Leblond Multicut.

MILLERS

- Nos. 2A, 2B & 2B Milwaukee.
- Nos. 1½", 2, 3 & 4 Cincinnati.
- No. 1½" Rockford univ.
- No. 2 Brown & Sharpe vert.
- Size B Becker vertical.
- No. 6 Becker vertical.
- 24" Cincinnati duplex.
- 24" & 48" Cincinnati automatic.
- 24", 48", 54" & 66" Newton rot.
- 48" Ohio tilted offset.
- Nos. 13B & 33 B. & S. Mfg.
- No. 3 Sundstrand rigidmill.
- 66"x36"x8" Ingersoll adj. rail.
- No. 4—36" Cincinnati Hydromatic.

BORING MILLS

- 24" Bullard, side head.
- 30" Bullard, single turret.
- 34" Colburn single turret.
- 36" Niles car wheel.
- 42" Bullard with side head.
- 42" King, 1 pl. & 1 turret hd.
- 42" Detrick & Harvey.
- 50" Bullard.
- 40" Gisholt.
- 3" Binsee horizontal.
- 3" No. 0 Giddings & Lewis.

PLANERS

- 24"x24"x6" Gray.
- 24" Cincinnati crank.
- 30"x30"x12" Cleveland openside.
- 32"x30"x12" Niles.
- 36"x30"x12" Cleveland openside.
- 42"x48"x12" Cleveland openside.
- 48"x36"x10" Liberty openside.

PRESSES

- No. 51 Cleveland OBI.
- No. 5 Toledo OBI.
- No. 6 Consolidated OBI.
- No. 75 grd. Toledo openback.
- No. 1½ Bliss toggle draw.
- No. 266 Consol. cam draw.
- No. DDG 54 Ferracute cam.
- 600 ton Cleveland coining.
- Nos. 55½, 56, 56½ Toledo.
- Nos. 62, 64, 65, 66 Consolidated.
- No. PG 4 Ferracute.
- No. EG35 Erie punching.
- No. 41 & 41A Toledo horn.
- 72" No. 3G Bliss dbl. cr.
- No. 30A Bliss arch frame.
- No. 7 Z. & H. percussion.
- Nos. 23 & 25½ Consol. horn.
- No. 176A Consol. gap dbl. cr.
- No. 60D50 Cleveland dbl. cr.

RIVETERS

- High Speed:—Nos. 1½B, 2A, 3A, 4A, 5A, 6B & 7B.
- 20 & 50 ton Allen air.

SAWS

- 6"x6", 8"x8" & 12"x13" Racine.
- 6"x6" Peerless shaping.
- 23" Newton cold saw.
- 10"x10" Napier band.

SHAPERS

- 7" Rhodes.
- 10" McMahon.
- 15" Potter & Johnston univ.
- 16" Cincinnati.
- 20" Stepto.
- 24" Gould & Eberhardt.
- 24" Cincinnati: shaper planer.
- 24" Potter & Johnston univ.

SLOTTERS

- 2½" Garvin die.
- 18" Niles.

SHEET METAL TOOLS

- 10"x3/16" Chicago brake.
- 4"x½" Niagara shear.
- 10"x16" ga. Bertsch shear.
- No. 1 Gray metal cutter.
- Nos. 1 & 2 Campbell nibblers.
- ¾" & ½" Shuster straighteners.
- Nos. 1 & 2 Pettigall hammers.
- 1½"x1½" Bertsch angle roll.
- Spot welders, 7 to 100 k.v.a.

2000 Tools in Stock. Send for List.

MILES MACHINERY CO. SAGINAW, MICHIGAN

Radial Heavy Duty and Sensitive Drilling Machines

5' American 14" col. G. B. Radial.
6' American 16" Mounted on Arm Radial,
6' Cin-Bick. 15" col. G. B. Radial.
6' Mueller 10" col. G. B. Radial.
6' Prentice Cone Drive Radial.
3' Carlton Sensitive Radial with taper.
4' Hammond Sensitive Radial with taper.
C-12 Natco 12x18 Multiple Drill.
No. 13 Natco 14x20 Multiple Drill.
No. 14 Natco 16x24 Multiple Drill.
No. 30 Natco 18x34 Multiple Drill.
No. 30 Natco 22x38 Multiple Drill.
No. 60 Natco 3-way Multiple Drill.
24' Cincinnati Sliding Head Upright Drill.
26' Barnes Sliding Head Upright Drill.
3-Spindle Rockford 20" Gang Drill.
20' Cincinnati 4-spindle Gang Drill.

No. 2 Colburn Single Spindle Mfg. Drill.
D2 Colburn Heavy Duty Single Spindle Drill.
No. 217 Baker Heavy Duty Single Spindle Drill.
No. 314 Baker Single Spindle Heavy Duty Drill.
No. 2 Colburn 3-spindle Manufacturing Drill.
7-spindle Foote-Burt No. 2 Gang Drill.
16-spindle Moline Vertical Valve Guide Driller.
No. 3 Avey Duplex Horizontal Drill.
No. 1 Garvin 4-way Horizontal Driller.
1-spindle Leland-Gifford Mt. on Spindle Drill.
1-spindle Allen P. F. Sensitive Drill.
2-spindle Allen H. F. Sensitive Drill.
3-spindle Allen H. F. Sensitive Drill.
3-spindle Allen P. F. Sensitive Drill.
4-spindle Allen H. F. Sensitive Drill.
No. 1 Knight Driller and Miller.
No. 2 Knight Driller and Miller, P. F.

We carry a large stock of used machine tools.

Your inquiries will be appreciated.

The Strong, Carlisle & Hammond Company

1392 West Third Street,
CLEVELAND, OHIO

Branch 2832 East Grand Blvd.
Office: DETROIT, MICHIGAN

BORING MILLS, Horiz.

3½" G. & L. No. 32.
4" bar Landis No. 40 Floor.
5" bar, Niles Floor Type.
6" bar, N.B.P. Floor Type.
BORING MILLS, Vertical
36" Bullard Rapid. Pro.
51" Bullard, Cone Drive.
60" Gisholt, P.H.T.
7" - 10" Betts Ext.

DRILLS, Radial

6", 7" Cincinnati.
6" Reed-Prentice gear box m.d.
4" American Triple Grd.
4" & 5" Amer. Triple Purpose.
4" - 5" Blackford Motor-On-Arm.
6" American, univ. & plain.
3" American, sens. tapping.
2, 4 & 6 Spindle Allens.
3" Morris Gear Box S.P.D.
4 spindle No. 2B Edlund.
32" Cincinnati, tapping, m.d.

GRINDERS

10"x36" Landis Plain (3).
12"x32" No. 2 Landis Univ.
12"x36" Landis Plain.
16"x50" Norton Self Cont.
26"x94" Landis Self Cont.
26"x120" Landis Self Cont.
48" Badger face, Hyd. Feed.
No. 16 Blanchard, 26" belt.
No. 11 Landis Tool & Cutter.
No. 55, 60 and 65 Heald Cyl.
No. 70 Heald Internal.
14" P & W Surface M. D.

No. 2 B. & S. Surface M. D.
No. 13 B. & S. universal.
No. 103 Rivet Internal.

LATHES

13"x6" Seneca Falls, t.a.
14"x6" Monarch, q.c.g., cone.
16"x12" South Bend.
18"x8" Lodge & S., grd. hd.
18"x8" Reed Prentice grd. hd.
18"x8" Lodge & S., Cone.
26"x10" Greaves Klusman.
20"x10" Walcott, Q.C.G.
22"x8" Lodge & S., cone.
24"x12" Putnam Q.C.G., cone.
24"x16" Lodge & S., cone.
24"x19" American L. C. G.
28"x12" Schumacher Boye.
32"x14" Boye & Emmes, Cone.
36"x17" Chard, Grd. Hd.
36"x18" Bridgeford turning.
36"x20" L & S, Cone, T.A.
32"x17" Field, triple grd.
32"x22" Schumacher Boye.
36"x12" Bridgeford, Grd. Hd.
36"x16" LeBlond, cone, l.g.
36"x22" Pond Grd. Hd. m.d.
36"x38" LeBlond Grd. Hd.
42"x18" Pittsburgh OCG Cone.
42"x35" Putnam Grd. Hd. m.d.
52"x20" Gleason, Cone.

MILLERS, Production

4" Pratt & Whitney Spindle.
8" & 12" Pratt & Whitney.
18" Cincinnati auto. (8).
28" Cincinnati Semi Auto.

MILLERS, Plain

No. 1 Cincinnati, Univ.
No. 5 Cincinnati, Grd. Hd., P.R.T.
No. 4G LeBlond, Geared Hd.
Nos. 3B & 2B Milwaukee.
No. 2B Heavy B & S SPD.
MILLERS, Vertical
Model CS, Becker Continuous.
Model R Becker, feeds 36x14x
15, wpl.

Model C Becker, s.p.d.
No. 5B Becker, Cone.
No. 2 Knight.

PLANERS

84"x84"x18" N.B.P., M.D., 4
hds.
72"x72"x14" Betts 4 hds.
60"x60"x20" Pond, 4 heads.
42"x36"x12" & 24"x6" Cincinnati.
36"x36"x18" Sellers 4 heads.
36"x36"x8" D. & H. Openside
30"x30"x10" D. & H. Openside.
30"x30"x8" Gray.

TURRET LATHES

1½" & 2" P. & W's. (2).
No. 4 W & S Univ., Cone.
Nos. 3A & 2A W. & S. univ.
No. 4 W & S, univ., grd. hd.
No. 4 W. & S. cone, screw.
3¼"x36" & 2¼"x26" Acmes.
No. 5 Foster, 1-13/16" bar.
24" Gisholt, AC M/D. 3¼".
24" Gisholt, AC M/D. 3¼".
24" Gisholt Cone 5¼" H. S.
2¼"x24" & 3"x36" J. & L.

BENNETT-RAFKIN MACHINE TOOL CO., Inc.

Offices: 30 CHURCH ST., NEW YORK CITY

HILL-CLARKE QUALITY

No. 1-A Pratt & Whitney Jig Borer
New in 1937

BORING MACHINES

No. 1 Cleveland, 2½" bar.
No. 3-A Universal, 3" bar.
No. 2 Rochester, 3" bar.
No. 1 Lambert, 3" bar.
No. 3 Hamilton, 4½" bar, Fl. Type.
5" bar N-B-P Floor Type.

BORING MILLS

36", 42" Bullard "New Era".
42", 48", 54", 60" Colburn.
30", 52", 62" King.

DRILLS

1, 2, 3, 4, 6-spdl. Leland-Gifford.
1, 2, 3, 4, 6, 8-spdl. Henry & Wright.
No. 2 Colburn, 2, 3, 4 Spdl.
No. 4 Colburn, 2 Spdl.
No. 14 Colburn, Motor Drive.
No. 3-24" Defiance Hvy. Service.
No. 210-3 Spdl. Barnes.
No. 5 Foote-Burt, 4 Spdl.
No. D-4 Colburn.
No. 3, No. 4 Bausch Multiple.
3½" Western Plain.
4" Cincinnati-Bickford Plain Radial.
4" Fossick Plain Radial.
4"-5", 6" American Triple Purpose Radial.

GEAR CUTTERS

No. 16-HS Gould & Eberhardt.
No. 18-H Gould & Eberhardt.
No. 4-36", No. 4-48" Brown & Sharpe.
No. 3-52" Plauter Hobber.
No. 6-60" Brown & Sharpe.
Nos. 6, 61, 615, 62 Fellows.
No. 7 Fellows, Motor Drive, Late Type.
18" Gleason Tester & Lapper, Motor Drive.

GRINDERS

9"x18", 36" Cincinnati Plain, Saddle Type.
20"x168" Landis.
26"x96" Landis.
No. 1, No. 2 Brown & Sharpe Universal.
No. 4, No. 4-A Landis Universal.
No. 70 Heald Internal.
No. 18 Bryant Semi-Automatic Internal.
No. 10-16" Blanchard Vert. Surface.
No. 16-A Blanchard Auto. Surface.

LATHES

14"x6" Lodge & Shipley.
14"x8" Le Blond Grd. Hd. motor drive.
16"x6", 8" Lodge & Shipley Sel. Grd. Hd.
17"x8" Le Blond Hvy. Duty Grd. Hd. M.D.

NORTON MOTOR DRIVEN GRINDERS

6"x32"	14"x36"
10"x18"	14"x50"
10"x24"	14"x72"
10"x36"	14"x96"
10"x50"	16"x50"
10"x72"	16"x72"
	18"x96"

22¾"x120"

18"x6" Monarch Grd. Hd., Motor-in-Base.
18"x12" Lodge & Shipley.
19"x8" Le Blond Hvy. Duty Grd. Hd. M.D.
20"x14" Lodge & Shipley Sel. Grd. Hd.
22"x12" Lodge & Shipley, multiple stops.
24"x12", 14", 16" Lodge & Shipley Sel. Geared Head.
24"x14", 16" American, Geared Head.
30"x11", 15" American, Geared Head.
30"x16" American, cone dr., taper attach.
36"x14" Lodge & Shipley Sel. Grd. Hd.
66"x21" Putnam Triple Geared.

33"-60"x16" LE BLOND GEARED HEAD SLIDING BED GAP LATHE.

MILLERS

No. 2-B Brown & Sharpe Plain.
No. 2, No. 3 Cincinnati, Plain.
No. 2-B, No. 3-B Milwaukee Pl., Motor-in-Base, Universal Milling Attachments.
No. 3-B, No. 4-B Hvy., Brown & Sharpe, Pl.
No. 4 Cincinnati, Plain.
No. 1½, No. 2 B. & S. Universal.
No. 2, No. 3 Cincinnati H. P. Vertical.
No. 5-B, No. 6, No. C-2 Becker Vertical.
No. 3 Garvin Duplex.
No. 5-48" Cincinnati Hydromatic.
6"x14", 6"x48" Pratt & Whitney Thread.
No. 4, No. 8 Lees-Bradner Thread.

PLANERS

30"x30"x6", 9", 18" Cincinnati.
30"x30"x14" Gray, reversing motor dr.
36"x36"x8", 12", 18" Cincinnati.
36"x36"x12" Gray Maximum Service, M.D.
42"x42"x30" Niles-Bement-Pond, Rev. M.D.
48"x48"x10" Detrick & Harvey, Open Side.
60"x48"x20" Hamilton.
72"x48"x10" Cincinnati.
72"x60"x16" American Widened Pattern.
72"x72"x16" Cincinnati M.D.

TURRET LATHES

No. 4 Warner & Swasey Univ. Grd. Head.
No. 5 Foster Univ. Tur., A. C. & W. F.
No. 2-A, 3-A Warner & Swasey.
No. 3 Cinn.-Acme, A. C. & B. F.
No. 4-A Warner & Swasey, 7½" H. S.
No. 4-L Gisholt, 9¼" H. S.

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Automatic and Hand Screw Machines

4' American Radial Drill.

300 lb. Standard Automatic Drop Hammer.

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4½" Libby Turret Lathe, geared head, single pulley drive.

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24"x12' Boye & Emmes Quick Change Gear Engine Lathe, 2¼" H. S., 7' c.-c.

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No. 4 LeBlond Universal Miller with 12" Dividing Head, Cone Drive.

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No. 3, 4 & 5 Cincinnati, Brown & Sharpe & LeBlond Millers.

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42"—60"—144" Vertical Boring Mills.

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14x10' American Grd. Hd., M. D.

16x8' Monarch Geared Hd., M. D.

18x10' Boye & Emmes Cone Dr.

30x12' Boye & Emmes Cone Dr.

36x14' American Triple Geared.

No. 2A Warner & S. Univ. Turret.

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16, 20 & 24" G. & E. Cone Drive.

MILLERS

No. 2B B & S Plain S. P. Drive.

No. 2B Milwaukee dbl. overarm.

No. 4 LeBlond Plain, Cone Drive.

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No. 4 Rockford Back Geared Incl.

No. 3, 4, 5 & 6 Toledo Inclined.

Toledo Nos. 90C & 92C dbl. crk.

Ferracuta, Double Crank, Gap.

Horning Presses—all sizes.

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83"x¾" L. & A. 10" gap.

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96"x10 Gauge Robinson.

72"x14 Gauge Robinson.

72"x14 Gauge Niagara.

Nibbler—Gray ¾" cap.

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3' and 4' Radial Drill.

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11"x 5' Summit floor type, c./s. drive, (new).

10"x 6' Sidney floor type q. c. 3 step cone, d. b. g.

10"x 5' Monarch floor type, compound rest.

12"x 6' Monarch quick change gear.

14"x 6' LeBlond loose change gear.

16"x 8' Hamilton quick change gear.

16"x 8' South Bend loose change gear.

16"x 8' Monarch 3 step with taper attachment.

16"x 5' Monarch geared head motor drive.

14"x 8' Young loose change gear.

14"x 8' Monarch 3 step double back gear.

20"x10' Bradford heavy duty.

24"x24' Prentice, l. c. g. with raising block.

21"x10' LeBlond extra heavy duty.

21" and 24" Gisholt motor drive.

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No. 1 Kemp Smith universal milling machine.

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36"x36"x14' Gray Planer, 2 heads.

36"x36"x12' Gray, extra hvy. pattern Planer, 4 hds.

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 18"x14" Monarch Helical Grd. Hd. M.D.
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 20"x8" L & S Grd. Hd.
 20"x10" American 3 S.C.D. D.B.G.
 20"x14" Hendey Cone, Taper.
 21"x8" LeBlond, three step cone drive.
 22"x12" L & S Grd. Hd.
 24"x12" American Cone H.D. Q.C.
 24"x12" Lodge & Shipley Cone, Q.C.
 24"x22" Bradford Cone, Taper.
 25"x12" LeBlond, three step cone drive.
 30"x10" American, three step cone drive.
 30"x20" American 12 speed Grd. Hd. S.P.D.
 36"x12" L & S Grd. Hd. Taper S.P.D.
 36"x24" L & S Sel. Grd. Hd. Taper S.P.D.
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24"x24"x6" & 8" Gray Planers.
 26"x26"x8" Cleveland Openside.
 30"x30"x16" Gray.
 36" Cincinnati Openside Planer Shaper, M.D.
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16", 20" 24" Gould & Eberhard Cone Drive.
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 No. 12 Barber Colman Hobbers.
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 No. 3-48" Garvin Duplex M.D.
 No. 2 B&S Univ.
 No. 2 Cincinnati Plain.
 No. 2A Milwaukee Plain Mfg. S.P.D.
 No. 3 Cincinnati H.P. Univ. Div. Hd.
 No. 3 Kempsmith Univ. Cone.
 No. 4 Cincinnati Plain H.P. Cone.
 No. 4 Cincinnati Univ. H.P. Cone. Div. Hd.
 No. 4 Cincinnati H.P. Rect. O.A. S.P.D. Vert.

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1", 2" Acme Class A Bolt Cone.
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 8"x10 gauge.
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1 1/2" and 2" Acme Hand Screw Machines.
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 No. 4 Gisholt Plain.
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 14"x19" Fay Automatic.
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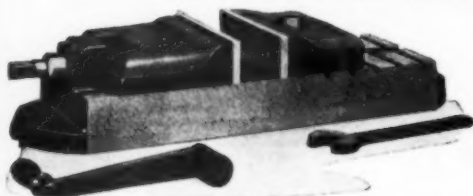


Front jaw is steel faced and swivels to securely hold taper work. Has rapid adjustment. Rear jaw is steel faced and cast solid.

Dimensions

Width of Jaw	8"
Depth of Jaw	2"
Jaws Open	5 1/4"
Weight	65 lbs.
Base, including Lugs	17 1/4" x 6"
Our price	\$17.50 — Regular price \$35.00

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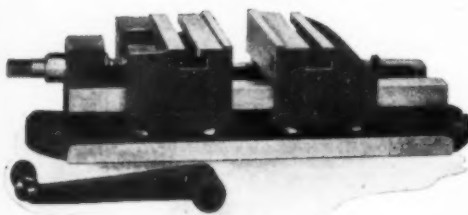


Front jaw is faced with steel and operated by screw, with crank handle. Rear jaw is faced with steel and adjustable to five positions.

Dimensions

Width of Jaw	7"
Depth of Jaw	2"
Jaws Open	7 1/2"
Weight	83 lbs.
Base, including Lugs	22 1/2" x 6 3/4"
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GENERAL PURPOSE VISE



For use on planers, shapers, drill presses or milling machines. Front jaw steel faced and operated by screw with crank handle. Rear jaw steel faced and has rapid adjustment.

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Width of Jaw	8"
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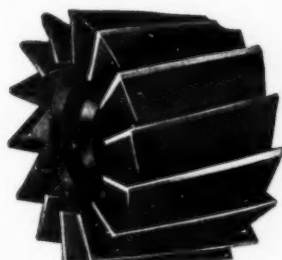
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Dia. Inch	Face	Hole	Net Price	Dia. Inch	Face	Hole	Net Price
2 1/4	1/2	7/8	\$2.25	3	1/2	1 or 1 1/4	\$3.20
2 1/4	1	7/8	3.00	3	5/8	1 or 1 1/4	3.45
2 1/2	3/16	1	1.55	3	3/4	1 or 1 1/4	3.75
2 1/2	1/4	1	2.05	3	7/8	1 or 1 1/4	4.05
2 1/2	5/16	1	2.15	3	1	1 1/4	4.35
2 1/2	3/8	1	2.30	3	1 1/4	1 1/4	4.95
2 1/2	7/16	1	2.45	3	1 1/2	1 1/4	5.50
2 1/2	1/2	1	2.55	3	2	1 1/4	6.70
2 1/2	5/8	1	2.80	3	3	1 1/4	9.05
2 1/2	3/4	1	3.00				
2 1/2	1	1	3.45	4	1/4	1	3.55
2 1/2	1 1/2	1	4.30	4	5/16	1	3.85
2 1/2	2	1	5.15	4	3/8	1	4.10
2 1/2	2 1/2	1	6.05	4	1/2	1 or 1 1/4	4.65
2 1/2	3	1	6.85	4	5/8	1 or 1 1/4	5.10
				4	3/4	1 or 1 1/4	5.60
3	3/16	1	1.90	4	1	1 1/4	6.55
3	1/4	1	2.50	4	1 1/2	1 1/4	8.55
3	5/16	1	2.70	4	2	1 1/4	10.50
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- 1-100 KW G. E. Synchronous, 125/250 V. DC
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HP	MAKE	VOLTS	RPM
2-60	G. E.	115	500/1500
1-50	Burke	230	400/800
2-35	Wgse.	230	350/1050
1-30	G. E.	230	500/1500
3-25	Wgse.	230	300/900
1-20	Triumph	115	250/1000

(Reversing planer motor)

Complete stock AC and DC motors, generators, M. G. sets, pumps, transformers, frequency changers, turbo generator sets, air compressors, etc.

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Drill, 6 spdl. Kerns b. b. tapping att. m. d.
 Radial drill, 6' Amer. triple purpose, m. d.
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Radial, 3 ft. Fostick.
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Prentice BB 4-spld.
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Demco DAH BB, MD.
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28" Hamilton BG PF SL.
26" Barnes BG PF SL.
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BG PF SL.
20" & 24" Prentice BG.

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Cutter and Reamer, No. 1 Cinc.
Cylindrical, 12x42", 10x30" Landis.
Disc, No. 6—20 Beisy.
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Drill, New Yankee, D. E.
Universal No. 2 B S.

Internal, Madison, Nos. 60 & 65
Head

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50-lb. Little Giant BD.
50-lb. Little Giant MD.
40-lb. Bradley Helve.
120 lb. Kane & Rosch.

LATHES:

26"x12" Putnam Pacific type, DBG,
Semi-QCG, taper attachment 20"
chuck; MD.
24"x10" South Bend QCG gap bed,
18"x8½" Rahn & Mayer.
18"x8" Lodge & Shipley MD.
17"x8" Sidney DBG QCG.
14"x6" Lodge & Shipley MD.

LATHES—Turret:

16" Type A Gisholt, 6¼" hole.
21" Type H, Gisholt, 3½" hole.
24" Type I Gisholt, 4¾" hole.
24" Type I Gisholt, 4¾" hole.
No. 4 Bardon & Oliver 1½" cap.,
b. g. and p. f. to turret.

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Arbor, Nos. 1½, 0, 00 Atlas.

Hydraulic, 42-ton Elmes.

OBI, No. 0, 4½" Loughborough-Jordan.
Str. Side, No. 7 Z & H, grated.

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Queen City DE, ½ in ½", M. D.
8" thr.
Rock River L, ½ in ½", 24 thr.
Cleveland C, SE, ¾ in ¾", 26" thr.
No. L-10 Badger, DE, ½ in ½",
10" thr.

SHAPERS:

20" Smith & Mills BG.
20" Cincinnati, traveling head, MD.

SHEARS:

Jig, G.E.M., 18 ga. cap., M.D.
Rotary Bevel, Lennox ¾".
Square, Stark 9"; 18 ga. cap.
Square 52" Niagara, gap, 16 ga.
Strawboard, 39" Jacques.

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Acme 1½", dbl. head, bolt.
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Pipe, No. 402 Oster MD 2".
Pipe, No. 300-A 2" Oster MD.
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51" Niles Vertical, 2 Heads.
10" Pond Vertical, 2 Heads.

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5" Cincinnati-Bickford Radial.

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16" Diamond Face.

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36"x16" American, Heavy Pat.

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MILLERS

20" Cincinnati Duplex.
No. ¼ Van Norman Duplex.
Model C Becker Vertical.
No. 2 Kempsmith Pl. Maxi., M.D.

PLANERS

30"x30"x10" Cleveland, O. S.
48"x48"x12" Cleveland O. S.,
Factory Rebuilt.
No. 218 Newton 24" Rotary, M.D.

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No. 20-B Bliss Geared.
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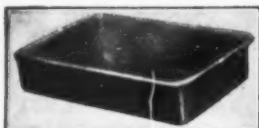
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Milw., SPD; No. 2 YB B. & S.,
M. D.

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No. 4, M. D.; No. 16 Stoll M. D.

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Advertisers Index

Aaron Machinery Co.	149	Ertel Machine Company	
Abart Gear & Machine Co.	115	Esley Machinery Co., E. L.	169
Acme Industrial Co.	99	Etico Tool Co.	28
Air-Way Pump & Equipment Co.	66	Ex-Cell-O Corporation	6, 120
All Steel Welded Truck Corp.	115	Failor-Strafer Machinery Co.	149
Alois Manufacturing Co.	109	Falk Mill Supply Co., Inc.	170
American Rotary Tools Co.	60	Federal Press Co.	71
American Tool Works	126	Federal Products Corporation	105
Anderson Bros. Mfg. Co.	95	Flynn Manufacturing Co.	
Armgo Company	82	Ford Mfg. Co., M. A.	115
Armstrong-Blum Mfg. Co.	Inside Front Cover		
Armstrong-Bray & Co.	134	Galland-Henning Mfg. Co.	49
Armstrong Bros. Tool Co.	30	Gallmeyer & Livingston Co.	121
Atlantic Gear Works		General Blower Co.	150
Atlas Equipment Co.	168	Gilman Engineering Works	63
Atlas Press Co.	84	Gits Brothers Mfg. Co.	85
Ayer Manufacturing Co., F. W.	22	Glenzer Company, J. C.	
		Gorton Machine Co., Geo.	100
Baldor Electric Co.	114	Grant Mfg. & Machine Co.	84
Baumbach Mfg. Co., E. A.	82	Greenard Arbor Press Co.	58
Belyea Company	154	Grob Brothers	
Bennett-Rafkin Machine Tool Corp.	162	Grobet File Corporation of Am.	104
Berkeley Engineering Co.	113, 125		
Bernstein & Co., Geo. M.	158	Hamilton Mfg. Co.	97
Beverly Shear Co.	84	Hamilton Tool Co.	55
Black Diamond Saw & Machine Works, Inc.		Hammond Machinery Builders	131
Blackstone Tool & Mfg. Co.	65	Hanna Engineering Works	75
Black Machinery Co., John	124	Hannifan Manufacturing Co.	1
Bleser Mfg. & Mch. Co. J.	152	Hardinge Brothers, Inc.	Front Cover, 5
Botwinik Brothers	173	Hartford Special Machinery Co.	
Bridgeport Pattern & Model Works		Harvey Goldman & Co.	158
Broadway Machinery Co., Inc.	174	Harvey Mfg. Corp.	103
Brown Machinery Co.	169	Harvill Manufacturing Co.	67
Buffalo Forge Co.	13	Haskins Co., R. G.	16, 21
Burke Machine Tool Co.	119	Hassall, Inc., John	55
Burr & Son, J. T.	122	Heim Co., The	108
		Hill-Clarke Machinery Co.	163
Candey-Otto Mfg. Co.	110	Hobart Brothers Co.	92
Carlson Mfg. Co., C. H.	120	Hoover Tool Co.	108
Carroll & Son, Wm.	62	Hotel Auditorium	102
Cerro de Pasco Copper Corp.		Hotel Barlum	83
Challenge Machinery Co.	31	Hotel Sterling	100
Chicago Die Casting Co.	124	Hotels Madison and Lenox	129
Chicago Electric Co.	168	Hovis Screw Lock Company	83
Chicago Gear Works	104	Hyman & Sons, Joseph	152
Chicago Rivet & Machine Co.	88		
Chicago Wheel & Mfg. Co.	90, 91	Ideal Commutator Dresser Co.	96
Cincinnati Machinery & Supply Co.	165	Indianapolis Machinery & Supply Co.	168
Clements Manufacturing Co.	127	Industrial Machinery Co.	149
Colonial Bushings, Inc.	27	Inland Machinery Company	166
Columbia Vari-Speed Co.	132	Interior Steel Equipment Co.	26
Colwell, S. G.		International Machinery Co.	160
Comet Tools, Inc.	96	Interstate Machinery Co.	155
Continental Machines, Inc.	45	Iroquois Machinery Co.	174
Conway Clutch Co.	18		
Crystal Lake Machine Works	120	Janette Mfg. Co.	106
Cushman Wheel Co.	Back Cover	Jarvis Co., Charles L.	11
Cushman Chuck Co.	14	Johnson & Sons Machinery Co., Wm. C.	156
		Johnson Tool Co., Inc.	116
Dalrac Tools Co.	47	Jones Machine Tool Co., Cincinnati	164
Dayton Rogers Mfg. Co.	117		
Dean Co., R. S.	176	Kearney & Trecker Corp.	
Delta Equipment Co.	170	Klauber Machinery Co., E. L.	152
Delta Mfg. Co.	25		
Denny & Clark	153	L-W Chuck Co.	89
Detroit Tap & Tool Co.	27	Lake Machinery Co.	171
DeWitt Tool Co.	166	Lang Machinery Co.	150
Dreis & Krump Mfg. Co.	3	LeBlond Machine Tool Co., R. K.	
Duro Metal Products Co.	34	Lenney Machine & Mfg. Co.	
		Lewthwaite Machine Co.	70
Eastern Machinery Co.	157	Lincol Electric Co.	38
Economy Machine Products Co.	56	Littell Machine Co., F. J.	102
Eider Engineering Co., Inc.	122	Lovejoy Flexible Coupling Co.	119
Electro-Matic Products Co.	80	Luma Electric Equipment Co.	62
Emmerman & Co., Louis E.	170		
Errington Mechanical Laboratory	123	M-B Products	128
		McDonald Machinery Co.	159
		Machinists Tool Grinding Co.	

Advertisers Index

Mall Tool Company	51	Scherr Co., George	180
Marr-Galbreath Machinery Co.	152	Schmidt, Geo. T., Inc.	94
Marshalltown Mfg. Co.	93	Scott-Bansbach Machinery Co.	153
Master Tapper Co.	129	Scully-Jones & Co.	135
Master Tool Co., Inc.	137	Segal Machinery Co.	151
Maxwell Company, F. A.	29	Sellstrom Mfg. Co.	98
Meylan, A. R. & J. E.	48	Seneca Falls Machine Co.	86
Michigan Chrome Co.	86	Service Co.	149
Midwest Equipment Co.	154	Severance Tool & Mfg. Co.	119
Miles Machinery Co.	161	Sheldon Machine Co.	118
Modern Collet & Machine Co.		Simmons Machine Tool Corporation	171
Modern Machine Corporation	106	Skilsaw, Inc.	7
Modern Machinery Co.	149	Sleeper & Hartley, Inc.	109
Morey Machinery Co., Inc.	175	South Bend Lathe Works	48
Morris Machinery Co.	174	Stackbin Corp.	72
Morrison Machine Products, Inc.	4	Standard Gage Co., Inc.	33
Motor Tool Mfg. Co.	118	Standard Machinery Co.	153
		Standard Pressed Steel Co.	23
National Machine Tool Co.		Stanley Electric Tool Division	80
Nedco Company	95	Stark Tool Co.	61
Nelson Machinery Co.	154	Starrett Co., L. S.	
Nema Electric Supply Co.		Steger Machinery Co.	
Nicholson & Co., W. H.	97	Stow Manufacturing Co., Inc.	
Nielsen, Inc.	111-179	Strand & Co., N. A.	15
Norgren Co., C. A.		Strippit Corporation	78
Norton-Broadway Machinery Co.	150, 164	Strong, Carlisle & Hammond Co.	162
Nutmeg State Machinery Corporation	149	Sun Machinery Co.	156
		Sundstrand Machine Tool Co.	43
O'Brien Machinery Co.	175	Surplus Material & Machinery Co.	149
Odin Universal Corporation	52	Surplus Stock & Machinery Co., Inc.	150
Oliver Instrument Co.	116	Sutton Tool Co.	59
Oliver Motorcraft Corp.			
Osborne & Sexton Machinery Co.	164	Tannewitz Works	56
Ott Machinery Sales, Inc.	175	Taylor Machine Co.	112
		Tomkins-Johnson Co.	12
Pasman Brothers	170	Tree Tool and Die Works	87
Pier Equipment Co.	103	Triplex Screw Co.	78
Plunkett Machine Co., J. E.	127	Troyke, Alfred H.	
Powermaster	111	Turner Uni-Drive Company	20
Pratt & Whitney	8, 9		
Precision Tool Co.	101	United Machinery & Supply Co.	151
Prints Electric Co.	70	Universal High Speed Tool Co.	
Procurian Safety Chuck Co.	19	Used and Rebuilt Machinery	149-176
Progressive Tool & Cutter Co.	74		
Prosser & Son, Thomas	126		
Putnam Tool Co.			
Pyrrometer Instrument Co.	76	Verson Allsteel Press Co.	57
		Victor Machinery Co.	176
Quality Tool & Die Co.	107	Victor Machinery Exchange	167
		Vimeo Mfg. Co.	117
R & L Tools	32	Vine, R. A.	152
Racine Tool & Machine Co.	179	Vonnegut Moulder Corporation	98
Reich Mfg. Co., J. R.			
Reliance Machinery Sales Co.	154	Walker-Teich Co.	81
Nemco Products Corporation	52	Walls Sales Corporation	107
Renu Tool Co.	68	Walton Co.	128
Reynolds Machinery	164	Ward Machinery Company	Inside Back Cover
Ridge Tool Co.	79	Wardwell Mfg. Co.	133
Rigid Tool Holder Co.	121	Wayne Transmission & Machinery Sales	152
Rivett Lathe & Grinder, Inc.	2	Wells Mfg. Corp.	77
Robbins Co., Omer E.	137	Wertman Machinery Co., M. A.	153
Rogers & Co., Samuel C.	130	West Penn Machinery Co.	151
Rogers Mfg. Co., Dayton	117	Western Tool & Mfg. Co.	
Rosenkranz, Weisbecker & Co.	150	White Machinery Co., A. D.	160
Ross Co., David J.	73	Whitney Metal Tool Co.	17
Ross Operating Valve Co.	69	Wigglesworth Machinery Co.	154
Russell Boring Bar Co.	130	Wiley's Carbide Tool Co.	10
Russell Machine Co.	154	Wilson, K. R.	30
Ryan Machinery Co.	82	Wittek Manufacturing Co.	64
		Wolnick Machinery Co., H. F.	153
Safety Socket Screw Corp.	35		
Sampson Tool Co., Inc.	24	Yoh Supply Co., Wm. S.	68
Schauer Machine Co.	102	Yost Mfg. Co.	42

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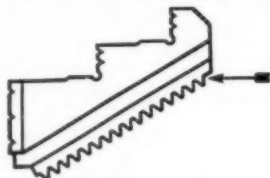
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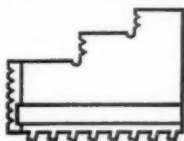


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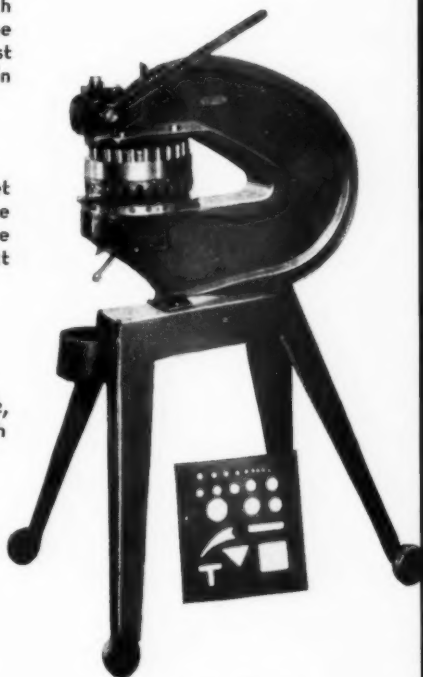
ROTEX No. 10

(Not illustrated)

9 Punches and a Shear

$\frac{5}{32}$, $\frac{3}{16}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2-inch Diameter and 2-inch Shear.

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